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TREATMENT OF ACUTE FRACTURES OF THE NECK OF THE FEMUR

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In discussing the subject of fractures of the neck of the femur, one must recognize at once certain "inevitables" which create a most difficult problem. These are (1) the advanced age of patients affected by this type of fracture, (2) the peculiar character of the bone that is directly involved, (3) the quality and distribution of the blood supply at the site of injury and (4) a weak anatomic location from the point of view of mechanics. One is handicapped at the very start with an old person, whose hip is broken in a place not only where the bone is narrowest and periosteal callous never forms, but where the blood supply is scanty and vulnerable and an enormous amount of mechanical strain is experienced.

The problem then, so far as treatment is concerned, is not an easy one to solve and, despite all efforts, still remains a challenge. To be sure, we surgeons have progressed far since the old days of sandbags, wooden splints and Buck's extension, and even passed a milestone when Whitman[1] advocated his abduction method of treatment, but, fortunately, we did not stop there. Instead, we have traveled on to a new and more hopeful solution, and have at present reached what may be considered another milestone of progress—the treatment of these fractures by means of internal fixation.

This new concept of treating fractures of the neck of the femur was presented by Smith-Petersen[2] in 1931 and, in the course of time, has gained almost universal acceptance. Many surgeons, as Harry Platt of Manchester, England,[3] have expressed the opinion that internal fixation with the Smith-Petersen triflange nail has entirely revolutionized the treatment of fractures of the femoral neck, giving a higher percentage of bony union, extending the scope of effective treatment in older and more frail patients, reducing the primary mortality and affording greater comfort in after-treatment. Or, as Watson-Jones[4] put it, "There can be no doubt that Smith-Petersen's discovery has not only revolutionized the prognosis of this injury from the point of view of union of the fracture, but is also to be regarded as a life-saving measure."

Similar optimism has been expressed in many parts of the world, including America, and I hope with justification, but we cannot be sure of our ground until the pitiless light of experience is shed on the facts and reveals the naked truth. Hence this symposium today.

It is high time that we took stock and decided where we are at present and how far we have yet to go; in order to do this, we must direct our thought first to the treatment of the acute type of fracture of the femoral neck.

SELECTION OF PATIENTS FOR OPERATION

Fortunately, few patients with fracture of the neck of the femur are ineligible for the operation known as hipnailing. In some clinics, it is only the moribund or acutely ill that are deprived of its advantages. Certainly, the patient's age alone has proved to be no contraindication—as is well known to all who have had patients over 90 years of age that not only have survived the operation, but have continued to live in comfort for years following it.

Groves[5] is not convinced that anything is to be gained by operative treatment of this fracture in the extremely old and feeble persons, and suggested Russell traction for these, but other authorities expressed the belief that hip nailing is especially applicable to the aged and infirm because, in spite of greater risk, it may be lifesaving Thomas King[6] of Australia stated that unless the patient was bedridden or moribund every intracapsular fracture under his care has been treated by operation. However, he always withheld operation when the temperature was raised or pulmonary changes were present.

E. I. Lloyd[7] warned against attempting to cure pneumonia in moribund old women by nailing, but Brittain[8] advised it, and Thornton and Sandison[9] also did not defer operation on this account, and they recorded no deaths in 60 patients. As the operation is not dangerous, especially when done with the patient under local anesthesia with a minimum of gas-oxygen and with the aid of chemotherapy, they stated their belief that it is humane to operate and relieve the patient's pain—thus allowing more effective nursing of the pulmonary condition in the lateral and Fowler positions.

Certainly it is true, as King[6] stated, that never before have so many fractured femoral necks been treated with the object of obtaining osseous union, and yet the general mortality has not been increased by operation, but actually decreased. It is fair to conclude, then, that because of the comfort which it gives the patient and the minimum of risk involved, hip nailing is indi-

Read in a panel discussion on Fractures of the Upper End of the Femur before the Section of Orthopedic Surgery, at the Ninety-sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1947.

1. Whitman, R.: A New Method of Treatment for Fracture of the Neck of the Femur, Tr. Orthopaedic A. 1902, No. 15, pp. 338-352.
2. Smith-Petersen, M. N.: Intracapsular Fractures of the Neck of the Femur—Treatment by Internal Fixation. Arch. Surg. 23:715-759 (Nov.) 1931.
3. Platt, H.: Brit. M. J. 2:89 (July 11) 1936.
4. Watson-Jones, R.: Fractures of the Neck of the Femur, Brit. J. Surg. 23:787-808 (April) 1936.
5. Groves, E. W H.: Fractures of the Neck of the Femur. Brit. M. J. 2:491-493 (Sept. 14) 1935.
6. King, T.: Closed Operation for Intracapsular Fractures of the Neck of the Femur, Brit. J. Surg. 26:721-748 (April) 1939.
7. Lloyd, E. I., cited by King.[6]
8. Brittain, H. A.: Fractures of the Neck of the Femur, Brit. M. J. 1:773-775 (April 9) 1938.
9. Thornton, L., and Sandison, C.: Recognition of the Modern Treatment of Broken Hips, South. M. J. 29:456-460 (May) 1936.

cated for all patients, irrespective of their age, who have a fracture of the neck of the femur—provided that they are not acutely or hopelessly ill.

PROPER TIME FOR OPERATING

There has been a great difference of opinion among surgeons as to the proper time for operating in these cases, varying from immediate operation as an emergency procedure to waiting three weeks, in order to assess the patient's physical status and escape the high early mortality associated with fractures of the hip. So far as end results are concerned, there seems to be no appreciable difference between those patients operated on immediately and those operated on within a two or three week interval. In fact, Eyre-Brook and Pridie[10] reported osseous union in patients whose hips were nailed as long as thirty-three days after injury. Nevertheless, it seems logical to assume that the sooner the broken hip is nailed, the sooner will the patient be made comfortable, and the sooner will an improved circulation be established at the site of the fracture. Also, by early insuring the patient more freedom of activity, numerous complications may be avoided during convalescence.

Most writers on this subject agree that as soon as the patient is declared suitable for operation the procedure should be carried out. No mad rush is advocated, but a delay of more than one week is not generally considered advisable.

TYPE OF ANESTHESIA

There is apparently no uniformity of opinion among surgeons as to the ideal form of anesthetic to be used during the operation for fracture of the neck of the femur. Practically every kind of an anesthetic is mentioned by various writers, and none in particular is condemned. It is fair to state that, from data obtained in the recent literature, the majority of surgeons who treat this type of fracture use either spinal or some form of general anesthesia for patients under 60 years of age who are in good health. For the extremely old, feeble patients and in risky cases, however, their choice would be local anesthesia supplemented by gas-oxygen or ether at the time of the reduction of the fracture and during nailing, when complete relaxation is necessary.

TECHNIC OF REDUCTION

The importance of obtaining an accurate reduction in fracture of the neck of the femur cannot be overemphasized. Many surgeons have stated the belief that success or failure of treatment depends almost entirely on this one factor alone. Experience also would lead to the conclusion that the more accurate the reduction, the better the chances of union, and the poorer the reduction, the greater the chances of nonunion.

It behooves every surgeon who treats this fracture, then, to obtain the best possible reduction of it and, in order to do this, he must first study carefully its characteristic and distinctive features. This is not possible, as a rule, with the use only of the original roentgenograms, because in them the fracture lines are often overlapped and distorted, but after the use of traction for twenty-four or forty-eight hours, with the correction of external rotation of the limb, new roentgenograms can then be taken by a portable roentgen unit in both the anteroposterior and lateral planes, which will reveal not only the exact location of the fracture, but its obliquity and degree of comminution. It is most essential to have this data prior to operation, since such information often will determine the kind of manipulation that will be most effective in the reduction of the fracture.

It might be well to mention here the possible danger of overpulling by means of preliminary traction. Only moderate traction is necessary, as a rule. Thus, a 6 or 8 pound (2.7 or 3.6 Kg.) weight with Russell traction would be ample, depending on the size of the patient, and skeletal traction should never be required. The danger in overpulling is that the torn capsule may become stretched and elongated and that the femoral neck and head cannot then be controlled by the usual reduction maneuvers. King[6] found this to be true in a case in which finally open reduction was necessary.

As was mentioned, a careful study of the patient's roentgenograms after preliminary traction will aid in determining the proper manipulation maneuver to employ for reduction. In a great many instances, this will mean that only light manual traction on the limb, followed by internal rotation, is all that is necessary. In other instances, where a rotation of the fragments has to be corrected, the Whitman[1] method of reduction—extension, internal rotation and abduction—may have to be carried out.

If, in addition to a rotation deformity, there is overriding or shortening of the femur, then frequently the Leadbetter[11] method—hip flexed to 90 degrees, upward traction in the axis of the flexed thigh, together with slight adduction of the femoral shaft, followed by internal rotation of the thigh to 45 degrees, then circumduction into abduction, maintaining the internally rotated position—will be more effective. Many surgeons use the Leadbetter maneuver routinely for all types of central fractures of the neck of the femur, but it is perfectly apparent that, since no two fractures are identical, it is unreasonable to expect that any single method of reduction will be suitable or adequate for all fractures of the femoral neck.

An attempt should be made at the time of reduction to procure a valgus position of the broken fragments of the neck, if this is at all possible, since the position of valgus creates a "pressure" rather than a "shearing" force at the line of fracture and will aid in securing union. A little additional pull on the leg will sometimes accomplish this by causing the femoral head to rock into a position of valgus, which is advantageous, but too much traction—just as too much abduction—can have a detrimental and deforming effect. One must be careful about the degree of abduction and not overdo it.

Whether the reduction is satisfactory must be determined by clear roentgen views of the fracture, both in the anteroposterior and lateral planes, which requires considerable time and is one of the chief bugbears in the treatment of this fracture. Just a passing glance at the wet roentgen films is not sufficient; neither are indistinct and uncertain outlines of the femoral head and neck to be considered acceptable. One must exercise patience at this stage of the procedure and insist on accuracy—both as regards bone detail in the roentgenograms and reduction of the broken fragments. Should any deformity remain after reduction, further manipulation must be carried out, until the deformity is completely corrected. This may require various maneuvers

10. Eyre-Brook, A. L., and Pridie, K. H.: Intracapsular Fractures of the Neck of the Femur: Final Results of seventy-five Consecutive Cases Treated by the Closed Method of Pinning, Brit. J. Surg. 29:115-138 (July) 1941.

11. Leadbetter, G. W.: A New Method of Treatment for Fracture of the Neck of the Femur, J. Bone & Joint Surg. 15:931-940 (Oct.) 1933.

and tax the skill of the operator to its utmost, but unless the reduction is accurately obtained the operation of nailing or pinning should not be carried out, unless done by the open method—which will allow manual reduction under direct vision.

Probably the most difficult and unsatisfactory fracture of the femoral neck to reduce is the subcapital vertical type, in which the inferior edge of the proximal fragment projects as a spur or prong below the corresponding surface of the distal fragment (fig. 1). Such a fracture allows mechanically the greatest amount of "shearing" force possible, and for this reason, as well as the difficulty of obtaining an accurate reduction, it often fails to unite following nailing.

McElvenny[12] recognized the importance of this type of fracture and urged extreme care in its reduction, making certain that the distal fragment of the neck be placed well below and mesial to the proximal fragment. To accomplish this, it may be necessary to reverse the usual reduction maneuver and, after placing heavy traction on the leg in order to draw down the distal fragment, to adduct the limb so as to allow the spur portion of the proximal fragment to engage the distal fragment at a point above, and not below, its inferior border (fig. 2). This maneuver, followed by abduction, will impact the two fragments in a position that will produce less of a shearing force and more of a pressure one. Other surgeons, when confronted with this vertical type of fracture of the neck, are inclined to agree with King[6] that a bone graft should be used at the time of operation, in addition to the Smith-Petersen nail (fig. 3). McMurray[13] and a few others would immediately resort to an osteotomy rather than nail this type of fracture, which gives so little hope of future osseous union.

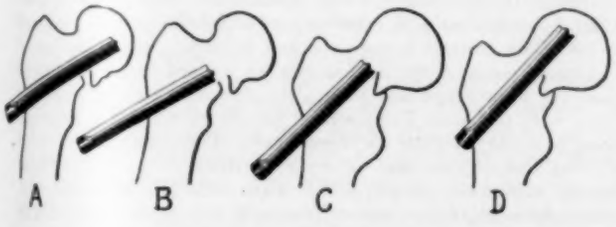

Fig. 1.—A, vertical type of fracture, with spike attached to caput femoris; bad prognosis, even with nailing. B, nail withdrawn to fracture line preliminary to manipulation. C, following manipulation (fig. 2) spur of caput femoris has been locked and impacted in cancellous bone of distal fragment. D, nail driven home.

After an accurate reduction has been obtained, some means of maintaining it during the process of nailing or pinning must be employed. Some use a fracture table for this purpose; others skeletal traction; others find manual traction by an assistant adequate and satisfactory. The advantage of having an assistant hold the involved leg is that, in addition to maintenance of the femoral shaft in the proper degree of internal rotation and abduction, the knee can be flexed and held at a right angle—thus helping to lock the fragments of the head and neck in position, by tightening the extensor group of thigh muscles.

It might be mentioned here that only a few fracture clinics in the world continue, at the present time, to reduce fractures of the neck of the femur by the open, operative method. Smith-Petersen,[2] who was the first to advocate this method, gave it up as a routine procedure in 1934 for the closed, extra-articular technic suggested by Westcott[14] and known as "blind nailing."

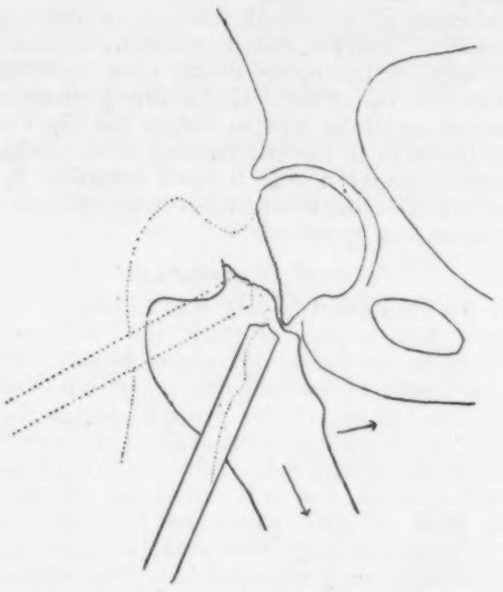

Fig. 2.—Diagram of manipulative procedure. Shaft of femur is pulled down and adducted in order to lock spur of caput femoris inside cortex of distal fragment. The fragments are then impacted by abducting the leg.

More recently, in 1935, Mr. R. Watson-Jones[15] of Liverpool, who was a strong advocate of open nail fixation, has also abandoned this method in favor of the "blind" operation—not so much on the grounds of simplification of technic as on the conviction that the less the fracture site was disturbed by the surgeon, the better. Most surgeons feel that a satisfactory reduction can usually be obtained by the closed method and that the "blind nailing" procedure produces the least amount of trauma to the patient and the least disturbance of the circulation at the site of fracture. The chances that

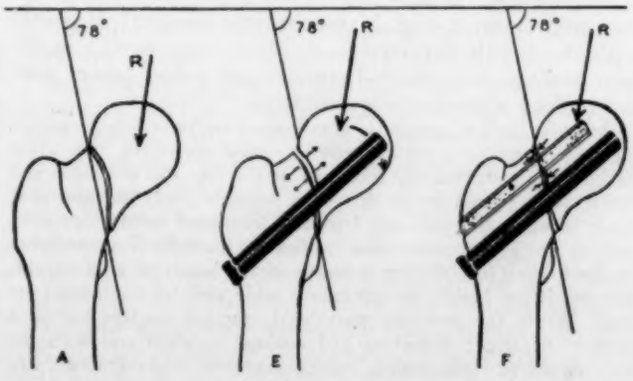

Fig. 3.—A, vertical type of fracture with fracture line 78 degrees to the horizontal; most difficult type to treat successfully. E, same fracture following reduction and nailing; shearing force still too great for successful healing. F, same fracture with additional insertion of a fibular graft to aid in fixation and union (King's method).

12. McElvenny, R. T.: Roentgenographic Interpretation of What Constitutes Adequate Reduction of Femoral Neck Fractures, Surg. Gynec. & Obst. 80:97-106 (Jan.) 1945.

13. McMurray, T. P.: Fracture of the Neck of the Femur Treated by Oblique Osteotomy, Brit. M. J. 1:330-333 (Feb. 12) 1938.

14. Westcott, H. H.: A Method for the Internal Fixation of Transcervical Fractures of the Femur, J. Bone & Joint Surg. 16:372-378 (April) 1934.

15. Watson-Jones, R.: Fracture of the Neck of the Femur, Brit. M. J. 2:235 (July 31) 1937.

a portion of the joint capsule will become interposed between the bone fragments after reduction, are so rare that this possibility, in itself, is not considered an adequate argument for the necessity of routine open reduction.

If, despite one's best and repeated efforts, an accurate reduction of a central fracture of the femoral neck cannot be effected, then two courses of procedure remain open to the operator—an open reduction or some form of osteotomy. McElvenny prefers immediate osteotomy if he fails to reduce the hip fracture or is in doubt as to the effectiveness of the reduction, while others prefer a trial at open reduction in such cases before resorting to either osteotomy or some form of reconstruction operation.

TECHNIC OF OPERATION

Here the old dictum "Every man to himself" applies with more than a grain of truth, for hardly any two fracture clinics in the world employ identical technics in the operation of internal fixation of hip fractures. It is not the purpose of this paper to discuss the relative merits of these numerous and various technics, or to mention all the materials used for internal fixation—such as lock bolts, stud bolt screws, lag screws, nails, various kinds of pins, wires and bone grafts. Nor will I be permitted in the time available to speak of the dozens of ingenious guides that have been invented for placement of the guide wire or Smith-Petersen nail.

The impression one gets in reading about so many of these different technics and pet gadgets is that the treatment of these fractured hips has become much too highly specialized and that a need for standardization is real. It is hoped that with the continuation of study on the end results of these fractures by orthopedic association committees one or two methods will be found so outstanding in their superiority that they alone will eventually be employed and standardized.

For the purpose of this paper, I will confine my remarks on the subject of operative technic to the type of procedure that is now used by the majority of the orthopedic staff at the Massachusetts General Hospital with the Smith-Petersen nail. Most of us used a guide wire technic, but Smith-Petersen and a few others prefer nailing without the guide wire.

Procedure.—The patient is anesthetized on an ordinary operating table, with an x-ray cassette or tunnel under the hips, after which the unaffected leg is flexed at the hip and its lower end comfortably placed on the arm of a portable x-ray machine that rests between the patient's legs and is aimed at the opposite, broken hip. The operator then carries out his reduction maneuver on the broken leg, placing it finally in the hands of an assistant, who is sitting beside the operating table and facing toward its head. While the assistant puts light traction on this leg in a position of slight abduction and internal rotation and with the knee flexed at right angles, roentgenograms of the fracture are obtained in both anteroposterior and lateral planes. This requires the use of two portable x-ray units, one previously placed under the good leg for the lateral view and the other a movable unit which can be swung over the hip area when needed for the anteroposterior view.

If the reduction of the fracture is considered to be satisfactory, the skin of the operative field is then prepared and draped, and the operation continued; if not satisfactory, the manipulation is repeated, being governed by the degree and character of the deformity remaining.

After accurate reduction and preparation of the operative field, a lateral incision about 5 inches (12.7 cm.) long is made over the greater trochanter and carried down to bone through the split fibres of the vastus lateralis muscle. This exposure allows ample room for the placement of the Smith-Petersen nail, and after the point for penetration of the cortex is determined, Westcott's[14] protractors or an anatomic marker is used for estimating the angle at which a 3/32 inch (0.48 cm.) guide wire should be introduced into the femoral neck and head. Care is taken not to drill this wire so deeply so as to penetrate the joint cavity. New roentgenograms are now taken in both planes to determine the location of the guide wire and whether it is placed properly—by which I mean through the lower half of the neck, parallel to the calcar femorale and centering in the proximal portion of the femoral head in both planes. A Smith-Petersen nail marker is then threaded over it and small cuts are made deeply into the femoral cortex with a fine osteotome, corresponding to the flanges of the nail. A cannulated nail of correctly measured length is now substituted for the marker and driven home over the course of the guide wire. Impaction of the fracture is then done, and a final set of roentgenograms taken to make sure that the nail is well centered and of proper depth, and that no distortion or angulation of the head has occurred.

If the roentgenograms show the first guide wire to be incorrectly placed, successive wires are introduced at the estimated proper angle and distance and new roentgenograms taken, until the operator is absolutely satisfied with the final position. Not until then should nailing proceed, keeping in mind Mr. Eric Lloyd's aphorism, "The bad results of nailing are the results of bad nailing."

Whenever a fluoroscopic table is available in the operating room, I prefer to do the reduction and fixation on it. The table x-ray unit is utilized for anteroposterior views and a portable unit is used for the lateral views. Direction of the guide wire is facilitated by inserting it under intermittent fluoroscopic vision, which is controlled with extreme care and requires only a second or two. The position is then checked in both planes by ordinary roentgenograms. A roentgenologist, or trained associate, supervises the fluoroscope and judges the direction and depth of the guide wire and nail. The operator checks all necessary observations, however, by clear roentgenograms. This arrangement saves a great deal of time and, in my experience, is the ideal technic for hip nailing. In one sense, it is a two man job, but because of this team work, fewer errors are made and greater accuracy is obtained.

POSTOPERATIVE CARE

The postoperative care of patients whose hips have been nailed varies tremendously in different clinics, from no external support of any kind for the hip following operation to protection in bed with leg traction for periods up to three months. A few surgeons prefer to get their patients up the day of operation or the following day, and one has stated that "in a few hours the patient is ready for a wheelchair and may at once, if so disposed, enjoy the use of crutches." Such heroic measures are, fortunately, not endorsed by orthopedic surgeons in general. I agree with many of my colleagues, who term such drastic procedures "stunt surgery." To be sure, it may be necessary on rare occasions gently to lift a feeble patient into a chair for short periods of time, being extremely careful to support the affected leg, but as a rule this is neither necessary nor advisable.

Watson-Jones[4] protects the operated leg in bed by attaching a wooden crossbar to the heel of the patient's slipper or shoe, which necessitates the leg's resting flat on the bed at all times, and prevents any external rotation. He expressed the belief that traction in a Thomas splint is dangerous in these cases, because of the long leverage that can place strain on the hip. Eyre-Brook and Pridie[10] use no external fixation of any kind, but allow the leg to rest on a pillow.

Still others, as McElvenny,[12] have stated their belief that no attempt should be made to hurry these patients out of bed; if the patients have done well in bed, McElvenny keeps them down from three weeks to twelve weeks—depending on their age, size and ability to handle themselves. Exercises and physical therapy were started about the fourth postoperative day, however.

The practice in the Massachusetts General Hospital Fracture Clinic has been to place these patients, after their operation, back in traction for one month, then to remove the traction, but to keep them in bed for another two weeks. At the end of six weeks, they are taught to walk with crutches, allowing the foot of the affected leg to touch the floor but not to bear any real weight. No walking caliper splints have been used. Subsequent roentgenograms determine whether full weight bearing shall be permitted at the end of four months, or later. In most cases, it is considered safer to wait until at least six months have elapsed before discarding crutches. In other words, we feel, as does Watson-Jones,[4] that early weight bearing is not imperative and may be dangerous.

PROGNOSIS

In order to discuss the prognosis of these fractures, a word or two should be said about their classification. Many classifications have been suggested for fractures of the femoral neck, particularly according to their location, but the only difference among them all is in the names, not the location. Suffice it to say that most writers now speak of the three main regions of the femoral neck relating to fractures as being the subcapital, central and basal, and the subdivisions of each fracture as being either horizontal, oblique or vertical in type, with or without comminution.

It is common knowledge that not only the location, but the nature of the fracture itself has a great deal to do with its reaction to treatment. Basal fractures, for instance, if accurately reduced and fixed adequately, will invariably unite. The same can be said of impacted fractures, although it must be remembered that roentgen evidence alone of impaction is not adequate or reliable grounds for an absolute diagnosis of this condition.

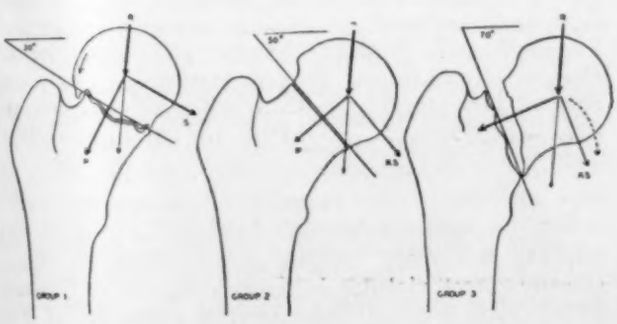

Fig. 4.—Group 1, impacted type of fracture; fracture line less than 30 degrees to the horizontal; no shearing force; good prognosis. Group 2, fracture line 30 to 50 degrees to the horizontal; some shearing force; requires accurate reduction and perfect nailing. Group 3, fracture line 50 to 90 degrees to the horizontal; prognosis bad, even with nailing. This type of fracture should be grafted in addition to nailing, or else be treated by osteotomy. (From Pauwels.[16])

F. Pauwels,[16] in his excellent monograph, "Der Shenkenhalsbruch, ein mechanische Problem," expressed the view that the obliquity of the fracture line is of paramount importance, so far as prognosis for osseous union of the fracture is concerned. For instance, he divided central neck fractures into three groups (fig. 4): (1) impacted fractures (fracture line less than 30 degrees to the horizontal) in which no shearing force occurs; the prognosis is good and no nailing is necessary; (2) fractures with their obliquity line between 30 and 50 degrees to the horizontal, in which there is some shearing strain unless the fracture is nailed; (3) vertical fractures, in which the obliquity of the fracture line is from 50 to 90 degrees to the horizontal. In these latter fractures, a long beak or spike is usually attached to the inferior edge of the caput femoris, and the prognosis is bad, even with nailing, unless a solid fibular graft is also used in the upper third of the femoral neck (fig. 3).

Pauwels' theory has had far reaching influence, not only in Germany, but in England and Australia as well. Here in America, a similar idea has been suggested by

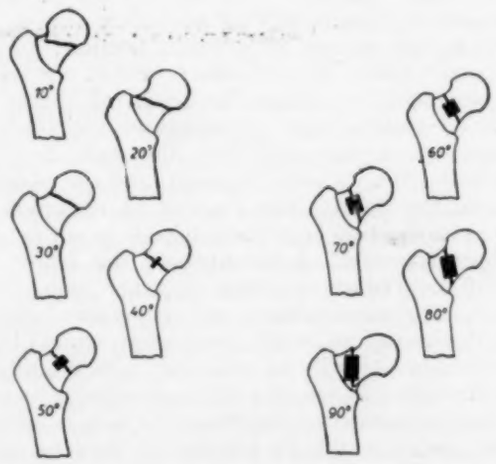

Fig. 5.—Fractures of the femoral neck with different angles of obliquity. When the angle is less than 50 degrees to the horizontal, the prognosis following nailing is good; when it is more than 50 degrees to the horizontal, the prognosis with nailing alone is poor, and there should be a bone graft as well or an osteotomy should be performed. (From Pauwels.[16])

McElvenny,[12] and all of us who deal with this problem surely feel as do Thomas King,[6] A. L. Eyre-Brook,[10] K. N. Pridie[10] and others that Pauwels' group 3 fracture, the vertical type, presents the most difficult problem of all to solve. Eyre-Brook and Pridie[10] found that they had no complications in any of their fractures of the femoral neck that had an obliquity angle of less than 53 degrees to the horizontal, and they expressed the opinion that the importance of this angle clearly outweighs nearly every other factor and should control the treatment given (fig. 5). In other words, they stated their belief that when the obliquity angle is over 70 degrees to the horizontal (50 to 90 degrees, Pauwels), some modification of the pinning operation should be employed—either the addition of a bone graft or a subtrochanteric osteotomy to decrease the obliquity angle.

Pauwels' work is most impressive and has led many surgeons throughout the world to consider seriously whether the end result of fractures of the femoral neck is not controlled by the nature of the fracture almost as much as by the surgeon and his nail or pins.

Another important influence affecting the prognosis of fractures of the femoral neck from the point of view of life expectancy is nursing care. We are all aware that these aged patients can and do survive the operation of hip nailing surprisingly well and can live on after it, provided they have excellent nursing care, but as soon as they are deprived of a high standard of hospital nursing and are sent away to a nursing home or to other institutions for the aged, they begin to fail and soon die.

16. Pauwels, F.: Der Schenkenhalsbruch, ein mechanische Problem, monograph.

Thus far, an attempt has been made to survey various factors that enter into the treatment of acute fractures of the neck of the femur. Just how much we have accomplished, how successful we have been and how much further we have to go in order to solve our problem will be learned from the papers that deal with end results and which are now to follow in this symposium.

CONCLUSION

In closing, it would seem fitting to enumerate the following things that we have learned about the treatment of acute fractures of the neck of the femur since the advent of the hip-nailing operation sixteen years ago: (1) that age is no contraindication; (2) that the optimum time for operation is within one week of the injury, and the earlier the better, all things being equal; (3) that accurate reduction of the fracture is of paramount importance, since the more accurate it is, the better the chances of union, and the poorer the reduction, the greater the chances of nonunion; (4) that skeletal traction or a traction table is not necessary to reduce fractures of the neck of the femur or to maintain the reduction while they are being nailed; (5) that, after manipulation and reduction of the fracture with the patient under anesthesia, manual holding of the fractured leg by an assistant, with the thigh extended, the knee flexed at right angles and internal rotation and abduction of the femoral shaft, is adequate; (6) that the most difficult fracture of the femoral neck to reduce and treat successfully is the subcapital, vertical type; this being so, its treatment by nailing should be supplemented by bone grafting, or else some form of osteotomy should be performed; (7) that fixation materials (nails, screws, pins, etc.) should be made of metals which produce no ionization in the tissues; (8) that arthrotomy is not necessary for nailing the majority of fractures of the neck of the femur; (9) that the operation can be performed with little trauma or shock; (10) that the proper position for the Smith-Petersen nail is along the lower half of the femoral neck, its sharp end centering in the proximal portion of the head of the femur in both the anteroposterior and lateral planes; (11) that the lateral roentgen view is indispensable in determining the reduction of the fracture and the placement of the nail; (12) that it is rarely necessary to drive the guide wire across the joint line into the acetabulum in order to control rotation of the femoral head when nailing; (13) that if multiple wires or pins are used for internal fixation of the fracture some form of retention apparatus—such as a nut threaded on the ends of the wires—must be employed to prevent them from wandering out of their position; (14) that patients can be gotten out of bed the day of operation or the day following, but that this procedure is not necessary as a rule, is often ill advised and should be employed only in exceptional instances; (15) that the prognosis of fractures of the neck of the femur depends, to a large extent, on their location, their obliquity, and nursing care; (16) that, according to the most reliable reports in the literature, internal fixation methods of treating fractures of the neck of the femur result in a higher percentage of bony union and a much lower mortality than do other methods such as those of Whitman, Roger Anderson, well leg traction, Carl P. Jones traction and the Wilkie boot.

MANAGEMENT OF THE TROCHANTERIC FRACTURE OF THE FEMUR

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Many erroneous concepts are common as regards fracture of the trochanter. Perhaps that most frequently met is that the trochanteric fracture is a simple lesion, easily handled and usually with good result. Under such a concept a good result must be accepted as that in which the patient escapes with life and deformity. Disability and discomfort during the final ensuing years are disregarded. Only on a percentage basis of an adequate number of cases treated may one rightly draw conclusions as to what constitutes the best mode of treatment with the most satisfactory results obtainable. In a recent survey of 133 consecutive cases treated on the orthopedic service at St. Luke's Hospital this lesion was shown not to be simple and not to eventuate routinely in a satisfactory result. Percentages of results could be and were estimated from this group. Often bitter experience led to the conclusions. These we shall later enumerate.

Patients with this fracture are an elderly group. Their average age is above 75 years. This places their age as more than twelve years above that of the average of patients with intracapsular fractures of the neck of the femur. Few years of life expectancy are left. Ninety per cent of the patients are women, a fact probably explained by the less rugged bony structures and usually more pronounced atrophic osseous changes in women. As would be expected, these old persons represent a veritable museum of pathologic changes aside from their fracture. Serious and commonly associated lesions include cardiac, diabetic and senile mental changes. Renal lesions, crippling arthritis, syphilis, carcinoma, hemiplegia and many other afflictions of the aged are present. A "good risk" for any form of treatment is a rarity.

TYPE OF INJURY PRODUCING THE FRACTURE

Injury is generally trivial, consisting of a simple fall, tripping over a rug, slipping out of a chair, etc. Occasionally direct violence is responsible. Most fractures of this type occur by dissolution of continuity of bony structures preceding the fall and are not the result of the fall. Perhaps the main contributing factor to such injury lies in the elderly person's inherent instability while erect and her slow reflex response. Despite the poor outlook for these patients, their response to rapid and definitive treatment for the relief of pain and spasm is good. Their resistance even to rather extensive surgical procedure when rapidly carried out and bolstered by supportive measures is excellent.

FACTORS MODIFYING THE MODE OF MANAGEMENT

There can be no question but that on a countrywide basis all such patients cannot be treated alike to secure the most favorable results. Many such fractures must of necessity be cared for in small or rural communities

Read in a panel discussion on Fractures of the Upper End of the Femur before the Section on Orthopedic Surgery at the Ninety-sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1947.

where transportation is impossible and surgical help unobtainable. The experience of the available medical and surgical personnel must always have a strong influence on the mode of treatment to be selected. The equipment available is not such an important factor, since any of the hereinafter enumerated methods of treatment may be used, even in a small home in a farming community, except that of open reduction and fixation.

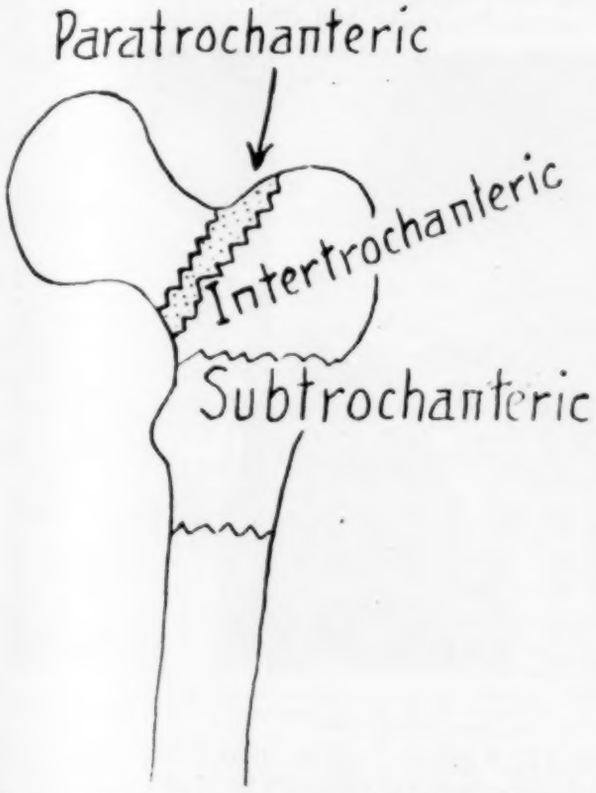

Fig. 1.—Trochanteric fractures may be roughly divided into three main classes, depending on the location of the major point of bony injury.

The type of trochanteric fracture (fig. 1) will to some extent influence the mode of treatment. It will, however not so greatly influence the mode of treatment as it will the end result to be secured and the length of time required for union. The paratrochanteric fracture will tend to result in a final external rotation deformity. The pertrochanteric fracture may evantuate in shortening with external rotation deformity. The subtrochanteric fracture will tend to be difficult to control and finally may result in rotation deformity, shortening and angulation.

MODES OF TREATMENT

Simple support by sandbags, pillows, etc. has long been used in the past for these fractures and still is occasionally used. Splinting the broken extremity to the opposite well leg likewise is occasionally accepted. Both measures are antiquated. Though occasionally still employed because of a fatalistic outlook that certain patients cannot recover and that facilities of nursing and care cannot be obtained, they should be discarded completely.

A simple Buck extension or adhesive leg traction may be condoned. It is, of course, unacceptable where facilities for other forms of treatment exist, but will give relief from pain and spasm. It will allow a certain amount of motion of the patient and facilitate nursing care. This simple traction is easily understood by the family and friends, and if properly applied and occasionally supervised may lead to a favorable result. For rural communities and for the patient who because of stubbornness, senility or other reason refuses to leave his home, it is adequate, though barely so.

Russell's balanced traction, though it seems complicated at first to the uninitiated, may be readily understood and is easily applied. Where more advanced treatment is impossible, it provides the same comfort as simple traction and a far better outlook for recovery without crippling deformity. This method of applying traction has come into such widespread use that, pending other facilities for the treatment of these patients, there is but little excuse for not employing it even under decidedly adverse situations. The last two modes of applying traction are simple, promote comfort and, to a considerable extent, provide adequate management of the patient. They do not provide for mobilizing the patient.

Well leg traction may be applied by numerous forms of apparatus or, indeed, with no apparatus at all save for plaster bandages and a basswood splint. Adequate well leg traction necessitates one simple surgical operation. Traction cannot be satisfactorily applied over a long period of time merely by boot application and traction on the injured limb through the pressures exerted by the boot on the foot. Transfixion of the injured femur with a Steinman pin to be incorporated in the upper portion of the traction boot is a necessity. Sterile procedures in the insertion of this pin and adequate dressings are of primary importance. Not only this, but at time of removal of the pin adequate sterile procedures must be provided to avoid infection. Immobilization of uninjured joint structures results from the use of this method and greatly complicates the postoperative period of recovery and eventual outcome. For this reason, though we used the method for three years in consecutive cases at one institution, and sporadically at many others, we have discarded it and would discourage its application. Russell traction is fully as adequate, is much simpler and produces many less complications. Well leg traction has one advantage that methods previously mentioned do not. With such apparatus in place the patient is transportable either from bed to bed or from house to house. Despite this the unfavorable aspects outweigh this advantage.

One may not disregard the plaster spica advocated by Whitman and its use for the trochanteric fracture. By this method the patient for the first time may become ambulatory. The same faults, however, appear as in the use of well leg fraction. Joints are immobilized and stiffened over weeks and months. Though union may be obtained, the results are better with balanced traction and far better with internal fixation. Not only this, but frequently the patient with a spica does not become ambulatory, and, if the patient be obese, cast retention may be impossible. After the chest, abdomen and extremity have been covered with a cast, other complicating lesions can neither be studied and evaluated nor treated. One would hesitate to discard the use of this form of treatment entirely, since under certain circumstances and in the favorable type of patient its use might prove of great worth either temporarily for transportation purposes or permanently where necessity decreed.

INTERNAL FIXATION

Internal fixation in treatment of such fractures at first gained whirlwind acceptance and as rapidly declined in favor. The problems and disadvantage of fixation by wires, threaded wires, pins, screws and

screw apparatuses rapidly forced it into the discard. Surgeons returned to an acceptance of balanced traction, well leg traction or the plaster spica. Then, following the demonstration of successful use of the Smith-Petersen three-flanged nail for intracapsular fractures of the neck of the femur, experimentation with a similar nail plus an attached or attachable plate for trochanteric fractures gradually developed. This form of treatment we now favor for routine use wherever surgical experience, equipment and outlook for continued existence of the patient make it possible.

RESULTS OF INTERNAL FIXATION AND TRACTION COMPARED

We have recently completed a survey of what we believe to be the most favorable form of conservative treatment of the trochanteric fracture, namely, balanced traction, and of internal fixation with the three-flanged nail. The nail used has a solidly affixed plate as designed by Jewett for fixation of the head and neck portion of the fracture to the shaft. A 94 per cent follow-up of 133 consecutive cases was carried out. One group of 38 patients treated by traction was compared with a second group of 95 patients treated by internal fixation. The final result is accurately known in all of the latter group. The study covered an eight and one half year period. The great bulk of the fractures were pertrochanteric (fig. 2) and generally comminuted (80

Fig. 2.—Pertrochanteric tractures constitute the majority. Nail placed in the lower portion of the head and neck and centered on lateral view (not shown) constitutes optimum position. Lesser trochanter can occasionally be affixed in place. The photograph on the right was taken seven weeks postoperatively.

per cent). The rest were subtrochanteric (fig. 3), paratrochanteric (fig. 4) and combinations of the foregoing.

Decision to attempt internal fixation as a method, replacing balanced traction, was made on a review of the records of the traction patients. A great many unsuspected complications appeared on their follow-up. Despite excellent nursing care, pressure sores over the sacrum and buttocks were the rule rather than the exception. Cystitis, bladder complications, residual stiff knees, hip contractures, permanent vascular changes, peroneal nerve palsies, muscle atrophy, senile psychoses, prolonged general inanition and debility and a high mortality were disclosed. A critical follow-up review shattered our complacency as regards the efficacy of conservative treatment and the end results secured. From past experience with the use of internal fixation with wires, screws, pins, etc., we were not sure that improvement could be gained with the angled nail. Despite this, trial seemed warranted. The flanged nail was chosen since the simple straight nail was unsatisfactory as inapplicable to the vast majority of these comminuted or displaced fractures. Pins, threaded pins, wires and screws had been discarded years previously as lacking stability. The three-flanged nail with plate affixed by nut or bolt was found to lack stability at the junction of nail and plate, and after trial was discarded. The Jewett nail was finally used and with a few minor structural changes has proved acceptable. It should be of "vitallium" or other nonelectrolytic metal. For satisfactory application such nails must be at hand with

Fig. 3.—Subtrochanteric fractures, so difficult to maintain in position are easily held by the Jewett nail. The photograph on the right was taken four and one-half months postoperatively.

Fig. 4.—Paratrochanteric fractures reduced by the nail are maintained without deformity of neck angle or rotation. Nails occasionally may be removed though usually are left in situ. The center photograph was taken nine months postoperatively, and the photograph on the right two and one-half years.

three angles and in two lengths to accommodate the various types of fractures. With such nails the comminuted paratrochanteric and intertrochanteric fracture can be adequately stabilized as well as the subtrochanteric or high femoral shaft type of fracture, which is so difficult to control. Even in those rare fractures in which both the neck of the femur and the trochanteric region are involved, stability may be secured. While reduction and fixation of the lesser trochanter is not a necessity, it too can frequently be affixed by this apparatus. Where nailing is properly done no coxa vara or external rotation deformity will develop unless the nail breaks, bends or pulls out of the bone. The nail most frequently used is angled at 130 degrees and is of 3 inch (7.6 cm.) length.

To secure operative speed, and speed is essential, a surgical and roentgem team must work together. Mechanical details of reduction and nailing have been published elsewhere.

POSTOPERATIVE CARE

After operation patients are replaced temporarily in light traction pending application of a Thomas brace with pelvic band and knee lock. Continuance of such a brace until solid union is obtained is essential. Early full weight bearing with the brace is neither necessary nor advisable. Crutch ambulation with minimal weight bearing can rapidly be permitted. Union rarely occurs before three months and sometimes is not complete up to seven months. This can be clearly shown by progressive protrusion of the nail through the neck and head as time passes. Too early or active weightbearing can encourage this protrusion. Allowance must be made for the progressive protrusion by selection of a nail which is not too long. We would urge that early mobilization of the patient is admirable but early full weight bearing may prove disastrous.

One must continuously remain aware of the fact that these patients are old and afflicted with many debilitating factors aside from their fractures. They have been badly injured and need especial nursing attention and care. Fluids by infusion, high protein intake, close attention to skin pressure points, indwelling catheterization for incontinence, frequent change of bed linens, rapid cessation of sedation, cardiac investigation, consultation and medical care must all be carefully carried out.

COMPLICATIONS

There have been complications from this method of treatment but far less frequent and much less devastating than those found in the conservatively treated group. Four infections occurred, two of minor importance, while two were gas gangrene resulting fatally. The patients are aged and the tissues devitalized, and unless care is taken considerable muscle damage may be done. Pulmonary embolus occurred but twice among 95 patients, both times eventuating in death. The source of embolus in 1 case was proved by autopsy to be in the uninjured leg. Postoperative pneumonia occurred in 2 patients and was successfully treated. Nails broke in 3 instances and were replaced. In 4 instances the nail tore out of the bone, twice through the side of the head and neck of the femur and twice pulling the screws out of the shaft of the femur. In 2 of these the nail was replaced and in 2 others union was obtained though with some deformity. Early weight bearing against advice or refusal to wear the brace accounted for these mishaps. No cases of nonunion or aseptic necrosis of the head of the femur have occurred.

The most annoying complication has been that of overdrive. Gradual perforation of the nail through the head occurs until union takes place. If too long a nail is used in the first instance and closely approaches the cartilaginous surface of the head, gradual protrusion during healing and union may occur with perforation of the head by the nail and impingement against the acetabular margin. We had not expected this situation and discovered it by follow-up roentgenogram. Most of the patients were asymptomatic though with some limitation of motion and development of traumatic arthritic change in the acetabulum. Removal of such nails has been simple and without operative complications. Such protrusion has been most frequent in the intertrochanteric comminuted type of fracture.

Comparative Hospital Mortality.—Under conservative traction treatment there was a hospital mortality of 36 per cent. In the cases in which nailing was done there was a hospital mortality of only 12.6 per cent. Hence three times as many patients died during their hospital care under conservative treatment as did when open reduction and nailing was employed.

Comparative Development of Senile Psychosis.—Development of severe senile psychosis is apt to occur in patients of this age group. Such a complication is almost worse than death, since it divorces the patient permanently from his family and yet demands continuing expensive care and a debased and suffering existence. In 11 per cent of the patients treated by balanced traction such psychoses developed, and they were transferred permanently to mental institutions. Of the patients who were operated on and whose fractures were supported by internal fixation only 2.1 per cent experienced similar psychoses.

Other Complications.—Other complications such as incontinence, cystitis, pressure sores, stiff knees, permanent vascular changes, peroneal nerve palsies, muscle atrophy and permanent hip deformities were found to be decidedly reduced in the group treated surgically.

SURVIVAL

Considering the advanced age of these patients as a group, not many can survive for more than a few years regardless of mode of treatment. However, on reviewing the patients we found that of those treated by traction only 32 per cent survived one year from the date of fracture. Contrast this with the 72 per cent who survived one year treated by internal fixation. By the end of the second year only 29 per cent of the traction-treated patients were alive, while 38 per cent of those treated by internal fixation survived. At the end of four years only 13 per cent of the conservatively treated patients were alive, while 30 per cent of those in whom nailing was done survived.

HOSPITAL SECLUSION

A long hospitalization has many disadvantages. On humanitarian grounds one may disregard expense, but on factual grounds for a large group of patients no institution management does so. Regardless of the factor of expense, the patients themselves do not care for prolonged incarceration. Traction-treated patients remained an average of fourteen weeks, while those with internal fixation stayed but eight weeks. Even this eight weeks' stay was a kindness rather than a necessity. Clearance of bed facilities for other desperately needy patients was greatly improved by surgical treatment

SELECTION OF CASES

It is difficult to select the case in which one refuses to use nailing in view of our experience. We have refused operation twice in the past two years. In both instances the patients could undoubtedly have been given the benefit of internal fixation. We believed both moribund; yet one lived eight days and the other twelve days in traction. Responsibility of not operating on these elderly patients is serious. Clearly these 2 patients had sufficient vitality to have withstood operative procedure. Perhaps had we nailed their fractures they might have lived. Even if operation were merely the means of keeping the patient comfortable during terminal stages and free of painful complication, it would be justified. The same experience has been found in these patients with trochanteric fractures as was found in nailing fractured necks of the femur. Frequently the patients survive despite adverse preoperative opinion. We now operate on and nail all intertrochanteric fractures.

SUMMARY

Because of circumstances regarding the location of the patient, the experience of the surgeon, and the equipment available, conservative treatment of the trochanteric fracture may be necessary. The best conservative treatment we believe to be balanced Russell traction.

Internal fixation with the Jewett nail, an angled appliance, has reduced hospital mortality to one third and development of severe senile psychosis to one fifth of that sustained by patients treated in traction. All other complications are sharply reduced. It has produced a four year survival rate over twice that of conservatively treated patients while greatly improving the functional end results of the survivors.

Surgical reduction and fixation of trochanteric fractures with the angled nail is difficult and requires experience. Certain complications such as progressive protrusion of the nail and tissue necrosis may be avoided by advance knowledge of their occurrence and care in their prevention.

Two Categories of Teachers.--Thomas Lewis clearly foresaw such a danger and warned against it; but it is clear that the presence in the modern medical school of two categories of teacher, the practising consultant and the salaried academic teacher, opens the door to this disastrous dichotomy. The practising teacher is familiar in his everyday work with the individual seen against the backgrounds of his home, his family, and his work. The full tide of human needs and distresses bears down daily upon him, and the arts and techniques of medicine are his constant and exhausting preoccupation. He may cease to look beyond them.

For the cloistered academic teacher life is different. He gets his patients washed and tidied and laid out in rows in hospital wards; their importunate and exacting wives and mothers-in-law do not intrude upon his profound cogitations. No unpleasant smells or noises break in on his ordered eloquence; house-physicians and nurses wait on his bidding and tremble at his voice, and all those seeming irrelevances that are so necessary to the balanced comprehension of the patient's total situation are carefully tidied away out of his sight. He does not miss them, for he has never known them. He is rather like the florist who can arrange the plucked blooms, from which the dead leaves and the dirty roots have been removed and the earwigs shaken off, into all the combinations of form and colour his fancy dictates.--Walshe, F. M. R.; Teachers of Medicine, *Lancet* 2:817 (Dec. 6) 1947.

MEDICAL MANAGEMENT OF THE PATIENT WITH A FRACTURE OF THE HIP

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Except in rare instances when younger persons receive severe and unusual trauma such as would occur in automobile accidents and the like, persons who sustain a fracture of the hip are adults in the older age group. The general medical management of these patients therefore resolves itself largely into a problem of geriatrics. To determine the incidence and the nature of the more common medical problems and complications encountered analysis has been made of all cases of fracture of the hip treated in the Hospital for Special Surgery during ten years ending December 1946.

Seventy-two per cent of the patients were women (table 1); the largest incidence occurred between 70 and 80 years. The average age of the women was 66 years, ten years older than the average age of the men and three years older than the general average. The differences in age between sexes is clearly shown in table 1. This appears to be because men are apt to sustain severe trauma in the course of their work at a younger age than the women, who usually fall about the house or in the street.

TABLE 1.—*Age Incidence of Patients With Hip Fractures*

Cases		Years 20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	Average Age
Male	47	2	6	7	11	11	5	5	0	56
Female	121	2	4	7	19	29	42	16	2	66
Total	168	4	10	14	30	40	47	21	2	63

Many patients were obese women in the postmenopause period. Significant osteoporosis was frequent and is undoubtedly important in the etiology of fracture. Most of these patients reported a "fall and fracture" One wonders whether in some instances the fracture may have occurred first and caused the fall. No doubt in most of the cases fall caused the fracture in bone greatly weakened by osteoporosis and with the added trauma of obesity which normal bone would ordinarily withstand.

Significant complications occurred in 17 per cent of all cases (table 2). No complications were encountered in patients under 40 years of age. The patients in all but 1 complicated case were more than 50 years old; the average age was 71 years. Again, the average age of the women was ten years older than that of the men. Fatal

TABLE 2.—*Age Incidence of Common Complications in Patients With Hip Fracture*

Cases	Total	Years 40-49	50-59	60-69	70-79	80-89	90-99
Diabetes	6		1	1	2	2(2)	
Decubitus	4		2		2(1)		
Pneumonia	7			2(2)	1(1)	3(2)	1(1)
Hypertension	6			2	4		
Pulmonary Embolism	4	1	2(1)	1(1)			

Total cases with complications: 29; average age: 71
Male: 7; average age: 64
Female: 22; average age: 74

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cases are shown in parentheses; all but 1 were in patients past 60 years. Note that 6 of the 7 patients with pneumonia and 2 of the 4 patients with pulmonary infarction died.

The incidence of arteriosclerosis is not statistically analyzed because frequently no comment was made concerning sclerotic arteries, although such must have existed in most of the patients past 60 years of age. Arteriosclerosis was diagnosed usually only when it was considered responsible for some other illness. Also, the incidence of obesity could not be accurately determined, for this diagnosis was made only when it was rather severe.

Common preexisting complications were obesity, diabetes mellitus, hypertensive vascular disease and arteriosclerotic-heart disease (table 3). None of these illnesses appeared to endanger the patient or cause death,

TABLE 3.—*Preexisting Complications in Patients With Hip Fracture*

	Number	Percentage
Obesity	10	6.0
Diabetes	6	3.6
Hypertension	6	3.6
Arteriosclerotic heart disease	5	3.0
General arteriosclerosis and senility	3	1.8
Paget's disease (bone)	1	0.6

but may make management of the patient difficult should infection or vascular accident occur. Diagnosis of renal and hepatic disease was not encountered among the cases analyzed.

The most important complications were those acute illnesses which occurred after the fracture (table 4). These were chiefly pneumonia, decubitus ulcers, phlebothrombosis and pulmonary embolism. It is significant that most of the cases of pneumonia and pulmonary embolism occurred in patients confined to bed.

TABLE 4.—*Complications Following Hip Fracture*

	Number	Percentage
Pneumonia*	7	4.2
Decubitus ulcer	4	2.4
Pulmonary embolism†	4	2.4
Thrombophlebitis	2	1.2
Inanition	2	1.2
Cerebral hemorrhage (traumatic)	1	0.6
Hypertensive encephalopathy	1	0.6
Anemia	1	0.6
Pulmonary embolism or coronary occlusion	1	0.6

*Four patients were bed patients at onset of infection; 1 in a wheel chair four days; 1 in wheel chair ten days.
†Three patients were treated in bed; 1 in wheel chair four days before embolism occurred.

The over-all mortality rate was 7.2 per cent (table 5). The average age in fatal cases was 74.5 years; 67 per cent of the deaths were in women. Fifty per cent of all deaths were due to pneumonia in patients more than 60 years of age (1 was 95 years). One patient became ill on the fourth postoperative day, 2 during the fourth week and 3 during the third and fourth month after fracture. Most infections began in bed patients or in those who had just begun wheelchair activity. In these 6 fatal cases of pneumonia there was arteriosclerotic heart disease in 2, decubitus ulcers in 2, and in 1 hypertension, decubitus and arteriosclerotic heart disease occurred. Both fatal cases of pulmonary embolism were in bed patients; 1 occurred on the sixth day, and 1 on the eighth day after fracture.

When the various complications are tabulated in correlation with one another (table 6) it is noted that frequently obesity, diabetes, hypertension and arteriosclerosis coexisted in the same patient. The lethal complications (pneumonia and embolism) in about 50 per cent of the cases were associated with arteriosclerosis or hypertension.

TREATMENT OF COMPLICATIONS

Prevention of obesity would undoubtedly lower the incidence of hip fracture, another of the many reasons for maintenance of normal weight during aging. Weight reduction should be started in all obese patients, if not before, at the outset of treatment for the fracture. In these older persons whose activity is sharply curtailed because of the fracture transformation of energy is small, frequently 1,500 to 1,600 calories per twenty-four hours; so in order to accomplish satisfactory weight reduction, the diet should provide 800 calories or less during each twenty-four hour period. It should contain 60 to 80 Gm. of protein and enough bulk to be satiating by liberal use of low carbohydrate vegetables and fruits.

It should be clearly understood that osteoporosis is not primarily a disturbance of calcium and phosphorus metabolism; it is the insufficient production of osteoid tissue. Most common causes are: (1) failure of stimulation of osteoblasts due to postclimacteric deficiency of steroid hormones; (2) decrease in stimulation of osteoblasts due to reduced physical activity (disease atrophy); (3) protein deficiency which depletes the bone matrix, and (4) old age atrophy of bone matrix.[1] If the frequency of the commonest of all types of osteoporosis, postmenopausal osteoporosis, and the many fractures directly due to it were better known there surely would be better prophylaxis. Postclimacteric persons should be particularly careful to insure a generous intake of protein, calcium and phosphorus. If roentgenograms revealed significant osteoporosis treatment should be instituted according to the plan recommended by Reifenstein and Albright,[1] using adequate amounts of estrogens or androgens. Of the former, doses of 0.5 to 1 mg. of diethylstilbestrol orally daily; 2.5 to 3.75 mg. estrone sulfate or 1.6 to 3.3 mg. estradiol benzoate two to three times weekly for two or three weeks then 5 mg. weekly for four to six weeks, and then rest one to two weeks will usually be helpful. Of the male hormone, 10 to 20 mg. testosterone orally and 20 to 25 mg. intramuscularly weekly for one to two months is good. Such a series may be repeated several times. One to two 75 mg. pellets of testosterone may be implanted every four months. When used, male sex hormones, should be given for at least two or three months. Retention of nitrogen and calcium, production of osteoid tissue and calcification of bone result, but benefit is notoriously slow. Treatment may be needed for many months. The value of prophylaxis should be emphasized.

Prolonged rest quietly in bed should be avoided whenever possible, for Deitrick and associates[2] and others have shown that this aug-

1. Reifenstein, E.D. Jr., and Albright, F.: The Metabolic Effect of Steroid Hormones in Osteoporosis, J. Clin. Investigation 26:24-56 (Jan.) 1947.

2. Deitrick, J.E.; Whedon, G. D., and Shorr, E.: Effect of Immobilization on Various Metabolic and Physiologic Functions of Normal Men, Am. J. Med. 4:3—36 (Jan.) 1948.

ments excretion of calcium and causes osteoporosis.

The treatment of hypertension and arteriosclerosis in a patient with fracture can only be ameliorative. Measures to reassure and quiet the patient are important: the wise use of sedatives is advised. Phenobarbitol in doses of 16 to 32 mg. two or three times daily is usually beneficial; combinations with vasodilators (such as mannitol hexanitrate) are popular but of limited value. In our cases these lesions had no effect or only minor influence on the course of the patient with fracture of the hip. However, severe arteriosclerosis may embarrass the course of the elderly patient; the general decline and death of some elderly persons with fracture must depend directly on advanced generalized vascular disease for which treatment is inadequate. The status of the heart and circulation should be determined promptly in all persons suffering fracture of the hip, and early correction of cardiac decompensation, if it exists, should be accomplished.

Diabetes mellitus is usually mild and easily managed in older persons and, as shown in the cases analyzed, it need not be hazardous in the patient with fracture of the hip. Proper diet and insulin, when needed, will control this disease so that it will not delay convalescence. It was pointed out by Newburgh[3] that in the older obese persons so-called diabetes is frequently due to fatty liver and the only treatment needed is a suitable reduction diet.

Most fatalities among the cases reviewed were due to pneumonia—50 per cent. However, penicillin became available only at the end of the period of this study; and sulfonamide compounds were available for only some cases. With antibiotic therapy now available some of these fatalities would not have occurred. It seems wise to employ prophylactic antibiotic therapy for seven to ten days after fracture or surgical treatment. Penicillin, 200,000 units orally twice daily, will usually be sufficient; protection would certainly result from 100,000 units of crystalline penicillin intramuscularly each twelve hours. Such could have prevented death in only 1 of our 6 fatal cases, for 5 patients contracted their infection twenty-four to ninety-six days after fracture, which seems too long a time to continue prophylactic antibiotic therapy. Prompt use of peni-

TABLE 5.—*Deaths in Patients With Hip Fracture**

Immediate Cause of Death	Age	Sex	Type of Fracture	Treatment	Onset, Days After Fracture	Onset, Days After Operation	Activity	Other Illness
Pneumonia	74	F	Intertrochanteric	Closed, plaster	71		Chair 4 days	
Pneumonia	81	F	Intertrochanteric	Traction, Closed	76		Chair 8 days	
Pneumonia	60	M	Intertrochanteric	Shanz osteotomy	139	90	Bed	Arteriosclerotic heart disease
Pneumonia	95	F	Neck	Lippman screw	9	4	Bed	
Pneumonia	87	M	Intertrochanteric	Closed, plaster	22		Bed	
Pneumonia	68	F	Neck	Smith-Petersen nail	25	23	Chair 21 days	Thrombophlebitis, decubitus, hypertensive arteriosclerotic heart disease
Pulmonary embolism	50	M	Neck	Closed, plaster	8		Bed	
Pulmonary embolism	65	F	Neck	Closed, splint	6		Bed	Obesity
Inanition†	74	F	Intertrochanteric	Blade, plate			Bed	Decubitus; arteriosclerotic heart disease
Inanition‡	80	F	Neck	Smith-Petersen nail			Bed	Diabetes; arteriosclerotic heart disease
Cerebral hemorrhage, traumatic	77	F	Neck	Smith-Petersen nail	10	9	Bed	
Anemia?§	83	M	Neck	Smith-Petersen nail			Chair 26 days	Obesity; diabetes

*The mortality rate was 7.2 per cent; the average age, 74.5.
†Death occurred fifty-four days after the fracture and forty-six days after the operation.
‡Death occurred eighty-four days after the fracture and eighty-one days after the operation.
§Death occurred thirty-eight days after the fracture and twenty-six days after the operation.

TABLE 6.—*Correlation of Common Complications of Hip Fracture*

		Diabetes	High Blood Pressure	General Arteriosclerosis	Arteriosclerotic Heart Disease	Obesity	Decubitus Ulcer	Pneumonia	Thrombophlebitis	Pulmonary Embolism	Only Disease
Diabetes	6			1	1	5					
High blood pressure	6			1	2	3		1	2		
Arteriosclerotic heart disease	5	1	2				2	3	1		1
Obesity	10	5	3	2			2		1	1	
Decubitus	4	1	1		1	2		1		1	
Pneumonia	7		1		3				1		4
Thrombophlebitis	2		2		1	1		1			
Pulmonary embolism	4					1	1				2

3. Newburgh, L. H., and Conn, J. W.: New Interpretation of Hyperglycemia in Obese, Middle-Aged Persons, J. A. N. A. 112:7-11 (Jan. 7) 1939.

cillin when coccic pneumonia develops should greatly reduce mortality.

The second most frequent postfracture complication was phlebothrombosis, which in some cases produced pulmonary embolism and infarction. Two deaths were on this basis. Pulmonary infarcts were not more frequent in the patients treated with open surgery but were more frequent in patients who were confined to bed. The longest time after fracture that lethal infarcts occurred was eight days. Anticoagulants were not employed in our cases. Allen[4] has emphasized the postoperative value of "dicumarol" to prevent the occurrence and extension of venous thrombosis; calculation based on his statistics indicates that proper use of "dicumarol" in our cases could be expected to prevent both deaths which occurred from pulmonary infarction. It appears therefore that anticoagulants should be used prophylactically during the first ten to fourteen days after fracture of the hip, especially in bed patients, and certainly in all cases of pulmonary embolism to prevent extension of the phlebothrombosis and recurrent fatal embolism. The only danger in using anticoagulants is hemorrhage, and this is far less hazardous than is thrombosis and embolism. Hemorrhage can be prevented by proper control of coagulation time by laboratory guides. Anticoagulants should not be used without proper laboratory facilities. Vitamin K is a dependable antidote for excessive "dicumarol" effect.

Other important prophylactic measures against phlebothrombosis include leg exercises for those patients who need continued bed rest. An oscillating bed may be of distinct value if treatment for the fracture will allow its use. It is desirable to avoid long therapeutic bed rest in older patients; for this reason the nailing procedure and early ambulation are advantageous. In cases of identifiable leg vein thrombosis, in which anticoagulants are not employed, ligation and thrombectomy may be beneficial.

IMMEDIATE CARE OF THE PATIENT WITH A FRACTURE

Good nutrition is important for wound healing and for the patient's general health. The caloric value of the diet should be adjusted as indicated by the body weight: Obesity should be reduced, and the undernourished patient should have a high caloric diet. Adequate protein intake should be insured. There is now ample evidence[5] that the gastrointestinal tract of elderly persons can handle average or slightly high protein food mixtures well. Good protein hydrolysates and amino acid mixtures are now available if protein supplements are needed. It is well to give food orally whenever possible; parenteral feeding should be used only in patients who cannot eat or retain sufficient food. The only indication for a low protein intake is pronounced renal functional impairment; then the twenty-four hourly intake may need be sharply curtailed to help prevent renal failure.

Adequate vitamins should be used to prevent or correct a deficiency state. B complex and ascorbic acid are the most important vitamins and can be supplied by use of a good multivitamin capsule with 100 or 200 mg. of ascorbic acid added daily. Vitamin B complex may be helpful for anorexia. Most patients will absorb orally administered vitamins adequately, but with intestinal disease and for a short while after the operation the parenteral administration of vitamin B and C may be necessary or helpful.

Associated illnesses should be recognized and appropriately treated. The patient with arteriosclerosis or hypertension should receive special attention to prevent or correct a failing heart which may result from the embarrassment of the trauma or surgical treatment. Appropriate treatment for anemia should be instituted from the outset. Catharsis may be required for bed patients. Nervous and apprehensive patients will be helped by small doses of sedatives administered through the day; adequate sleep should be insured at night time, but generally the elderly patient requires small doses of sedatives. They should be discontinued when no longer needed.

SUMMARY

The medical care of the patient with hip fracture resolves itself into good management of an elderly, traumatized patient who may need surgical treatment. It is best provided by the close cooperation of an internist and the surgeon. Preexisting conditions seldom are important factors in survival but commonly affect the speed of convalescence. Tissue senility, degenerative and arteriosclerotic changes account for the fact that in the patients with a fractured hip the tissues have less resistance and reserve. Vigilant attention should provide best possible function of vital organs, good nutrition and proper treatment of coexisting diseases and complications. The most dangerous complications are pneumonia and phlebothrombosis with pulmonary embolism. There are now effective prophylactic measures against such complications which should be wisely employed.

The survival rate in the cases analyzed certainly indicates the improved care for patients with hip fractures due largely to improved anesthetics, better preoperative and postoperative care, greater surgical skill and improved technic. More vigilant medical care including the proper prophylactic and therapeutic use of antibiotics and anticoagulants will certainly further improve the convalescence of patients with fracture of the hip and will further increase their survival.

4. Allen, E. V.: The Clinical Use of Anticoagulants, J. A. M. A. 134:323-329 (May 24) 1947.
5. Freeman, J. T.: The Basic Factors of Nutrition in Old Age, Geriatrics 2:41-49 (Jan.-Feb.) 1947.

ASEPTIC NECROSIS OF THE FEMORAL HEAD FOLLOWING FRACTURE OF THE HIP

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The term "aseptic necrosis" has been applied somewhat loosely to designate vascular death of the head of the femur in certain fractures of the neck of the femur, traumatic dislocations of the hip and displacement of the upper femoral epiphysis. Similarly the term has been employed with the epiphysial changes seen in conditions such as Legge-Calvé disease.

It is essential to define what is meant by aseptic necrosis. It is clear in reviewing the literature that there are various concepts of the significance of the term which lead to ambiguity in diagnosis and studies on end results. Boyd's[1] recent report of complications of frac-

Read in a panel discussion on Fractures of the Upper End of the Femur before the Section on Orthopedic Surgery at the Ninety-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1947.

1. Boyd, H. B., and George, I. L.: Complications of Fractures of the Neck of the Femur, J. Bone & Joint Surg. 29:13-18 (Jan.) 1947.

tures of the neck of the femur illustrates his difficulty in differentiation of degenerative arthritis and aseptic necrosis. In our study, we have been confused as to when we could say this is definitely aseptic necrosis with arthritic changes or this is degenerative arthritis. If we regard any degenerative change in the head as resultant from aseptic necrosis, then we become confused in the changes noted in the hip joint after extensive fracture dislocations of the hip. Similar lesions are produced elsewhere in other joints by a process defined as traumatic arthritis.

The term "avascular necrosis" has been used for this entity and might be limited definitely to a generic term denoting essentially a dead head. Reparative processes make it possible to revivify the dead head with various end results, such as (1) degenerative arthritis, (2) a partial regeneration of the head with collapse of the superior weight-bearing surface of the head and (3) occasionally a regenerated normal-appearing head. "Avascular necrosis" then could well be utilized as the generic name for the entity denoting the static state, with the term "aseptic necrosis" used to denote the process of repair, a dynamic time period in which transformation of the dead or partially dead head has incompletely occurred, allowing the potential of collapse of the remaining untransformed portion of the head or lastly producing without collapse a degenerative arthritis, a descriptive term for the cartilage changes, necrosis and loss of joint space.

Avascular necrosis may, then, be defined as death to part or the whole of the head of the femur due to vascular damage primarily of the posterior and anterior circumflex femoral vessels. The vascular supply from the ligamentum teres may or may not be injured similarly. When avascular damage has been sufficient to produce necrosis, the deprivation of blood supply is immediate and the death of the bone tissue occurs in a matter of hours. The evidence clinically of death of the fragment is not manifest, however, by our best diagnostic methods roentgenologically until between the second and third month of the fracture. Density is the chief diagnostic feature, contrasting the atrophy of the distal fragment with the unabsorbed fragment of the head.

Not all fractures of the neck of the femur produce avascular necrosis. Watson-Jones[2] stated that subcapital fractures if above the site of the vascular entry inevitably, transcervical fractures frequently and basal fractures never undergo avascular necrosis.

Inasmuch as the diagnosis of avascular necrosis cannot be made clinically before the end of the second month, it is wise to regard all fractures of the neck of the femur of the subcapital type or the transcervical as potentially leading to avascular necrosis. Watson-Jones[2] stated that if avascular necrosis arises the result is a failure, but if avascular necrosis is avoided the result should be a brilliant success. His chief point here is well taken primarily, that avascular necrosis might not be the result of the original injury but can be produced by vascular damage from manipulation or by open reductions, cutting the capsule and further interfering with the blood supply.

The frequency of avascular necrosis following fractures of the neck of the femur treated by internal fixation and resulting in bony union is distressingly high. The report of a study made by the Academy of Orthopaedic Surgeons gave an incidence of approximately 40 per cent. Boyd's[1] figures are confusing but he stated in one chart that aseptic necrosis occurred in 33.6 per cent and arthritis in 33.6 per cent, which would give an aggregate of degenerative processes in 67 per cent of the healed fractures of the neck. Lawson Thornton[3] estimated that 50 per cent of the traumatic dislocations of the hip show later degenerative change. In our[4] cases of operative reduction of displaced upper femoral epiphysis the incidence of aseptic necrosis was only 4 per cent but the incidence of arthritis was 28 per cent, which again, combined in one figure, would express a degenerative process secondary to an avascular necrosis which would be significant. yet, again, degenerative arthritis in the untreated case of upper femoral displacement is the rule without evidence of avascular necrosis. This stresses the importance of defining the clinical entities seen as complications.

Brailsford[5] stated that he had not seen avascular necrosis result from external fixation. We have 5 such cases in this study; treatment by plaster spica cast was followed by bony union of the neck. We agree with Watson-Jones that the internal fixation in itself does not produce avascular necrosis. It does, however, produce a much higher group of cases in which bony union occurs even though a dead head was present, and the process of transformation of the dead head to a living head may be incomplete so as to produce collapse of the upper portion of the head as is seen in aseptic necrosis or to produce degenerative arthritis of the hip from necrotic cartilaginous changes.

CLINICAL ENTITIES COMPLICATING FRACTURES OF FEMORAL NECK

There are four main types of complications noted in the process of repair of fractures of the neck of the femur: 1. Bony union of the fracture may be followed after a period of functional use by pain, progressive loss of function with roentgen changes of varied densities in the head associated with loss of contour of the head from collapse of the superior weight-bearing surface of the head. This process we should like to term "aseptic necrosis," and we should like to confine this term to this specific lesion. 2. Bony union of the fracture may be associated with a period of function of the hip followed by pain and progressive loss of function associated with roentgen evidence of diminished joint space, normal contour of the head, areas of varying densities throughout the head and acetabular changes akin to arthritic changes. The term "degenerative arthritis" properly can be applied to this group of cases. 3. Nonunion of the fracture may be associated with a dead head. The hip has never functioned satisfactorily, and bony union has not occurred. Roentgenograms show the evidence of nonunion, and the head is dense in contrast to the distal fragment, denoting a dead head. Operative therapy for union might be successful, but the first or second complication might result later. 4. Nonunion of the fracture may be associated with a vital head. Here atrophy has occurred similarly in both fragments. The head is viable. Operative aims for union may well lead to success in healing without later degeneration of the head.

2. Watson-Jones, R.: Fractures and Other Bone and Joint Injuries, Baltimore, Williams & Wilkins Company, 1944, pp. 72-74.

3. Thornton, L.; In Bancroft, F. W., and Murray, C. R.: Surgical Treatment of the Motor-Skeletal System, Philadelphia, J. B. Lippincott Company, 1945, pt. 2, p. 998.

4. Badgley, C. E.: Arthroplasty of the Hip for Degenerative Hip Disease, in American Academy of Orthopaedic Surgeons Lectures on Regional Orthopaedic Surgery and Fundamental Orthopaedic Problems, Ann Arbor, Mich., J. W. Edwards, 1947, pp. 207-222.

5. Brailsford, J. F.: Radiology of Bones and Joints, Baltimore, William Wood & Company, 1934.

For many years Phemister[6] has consistently added to our knowledge of the pathology of these complications. From his first paper in 1920, on "Recognition of Dead Bone Based on Pathological and X-Ray Studies," to his last paper with Dr. Sherman, in 1947, there has been a clarification of the pathologic processes which produce these complications of fractures of the neck of the femur. We can best state the facts which he has substantiated by clinical and pathologic studies: 1. Union can occur in the presence of avascular necrosis.[6b] 2. Pathologic changes in the hip joint are rare if the head is alive, but are constant and may become severe if the femoral head is dead[6]. 3. Survival of the femoral head from the fracture depends on how much blood supply was damaged. There is no evidence that death of the head occurs long after the fracture when union has failed. 4. Circulation of the head occurs through the anterior and posterior circumflex vessels which lie in that portion of the capsule reflected on the neck and more especially in the posterior portion of the capsule. 5. If the posterior portion of the capsule remains intact, vascular supply may be sufficient. (Our findings of free blood in the posterior gluteal bursa may have significance as a diagnostic sign of vascular damage.) 6. If the head remains viable, but nonunion occurs, the principal change is disuse atrophy equal in both fragments. This nonunion head never collapses and the cartilage is well preserved. Operative procedures to produce union are usually successful and degenerative arthritis does not follow. 7. In a dead head from interference with blood supply, atrophy of disuse cannot occur. 8. The process of transformation of the dead head has been well described by Phemister and Sherman.[6c] It should suffice here to say that creeping substitution from the distal fragment with increased vascularity from the lower fragment and also from the ligamentum teres vessels is the chief process of repair. 9. Depression of the unaltered weight-bearing portion of head is indicative of beginning collapse of the untransformed portion of necrotic head. 10. A new fracture line passes through the zone of invasion and of replacement of dead bone by living bone. The invading front consists of connective tissue and blood vessels replacing dead marrow and some absorption of trabeculae replaced partially by spongy new bone. 11. Pathologic fracture at the junction of dead and living bone from prolonged weight bearing is common in aseptic necrosis. 12. Degenerative arthritis is regularly present in long-standing cases of necrosis of the head with nonunion, but rarely as severe as in old cases of necrosis of the head with body union. 13. When there is nonunion of the fracture, there is usually no collapse of the necrotic head, but if the fracture unites in the presence of a dead head and weight is borne, collapse of the partially replaced head is to be expected. 14. Operation on an ununited fracture of the neck with a dead head may result in bony union. Transformation may occur, but degenerative arthritis may develop later.

PREVENTION AND TREATMENT OF AVASCULAR NECROSIS

Care to prevent further trauma to the fractured hip should be observed. Vascular damage may result from rough handling in transport. Manipulative reduction should be carefully done to avoid damage. For years we have not manipulated fractures of the neck of the femur except in rare cases. Skeletal traction through the lower part of the tibia and fibula with Russell traction principle has satisfactorily reduced most of the fractures. If manipulation is required, usually a modification of the Leadbetter method is employed. Reduction can be accomplished immediately by traction, and, when the patient's condition warrants, early internal fixation should be obtained. At one time, a study of our statistics showed 90 per cent bony union in patients treated immediately by traction with internal fixation within forty-eight hours in contrast to 65 per cent bony union after a delay of two weeks prior to fixation.[8] The intervening capsule becomes adherent to the fracture site and interferes with closed reduction and healing unless treated early so that the capture can be freed from the bone ends.

Open operation should be avoided if possible. Incision through the capsule can interfere with the anterior circumflex vessels and do further vascular damage to the head of the femur. Certain fractures, however, which cannot be satisfactorily reduced are better treated by open operation and reduction accurately obtained under inspection. We have found unusual types of fractures, not described hitherto to our knowledge, which would have made closed reduction impossible. The cortex of the neck has remained intact in a few cases with the endosteal portion pulled out like a watermelon plug and remaining with the head fragment. Again, the reverse has happened, with a portion of the neck pulled out of the head fragment and with the cortex remaining on the head fragment, preventing reduction. The oblique fractures with a long fragment remaining on the inferior surface of the head fragment particularly are apt to be displaced on nailing unless open reduction is performed. Accurate reduction is essential to coaptate fresh fracture surfaces even though open reduction is required to achieve this.

Traction in bed for some time following nailing prevents displacing the nail. In some cases, adduction of the hip alone can displace the nail from the atrophic head in the elderly patient. We advise, if the patient can tolerate it, at least six weeks of continuation of skeletal Russell traction, which allows mobility of the hip and knee and relative freedom in bed.

Avoidance of weight bearing on the injured hip is insisted on for a minimum of six months in all cases. If at the end of two to three months routine roentgen check-up shows increased density of the head, particular emphasis is placed on avoidance of weight bearing and protection until transformation of the head is complete.

Transformation of the head to viable bone covered with functional cartilage may result even in the cases of avascular necrosis, if sufficient time is given without weight bearing for complete regeneration of the head. Collapse and degenerative arthritis are practically certain to result unless recognition is made of avascular necrosis between the second and third month after the trauma and avoidance of weight bearing is continued until the avascular head is completely revived.

Wise[9] has shown in his study of the autopsied speci-

6. (*a*) Phemister, D. B.: Recognition of Dead Bone on Pathological and X-Ray Studies, Ann. Surg. **72**:466 (Oct. 1920; (*b*) Repair of Bone in Presence of Aseptic Necrosis Resulting From Fractures, Transplantations, and Vascular Obstruction, J. Bone & Joint Surg. **12**:769-787 (Oct.) 1930; (*c*) Fractures of Neck of Femur, Dislocations of Hip and Obscure Vascular Disturbances Producing Aseptic Necrosis of Head of Femur, Surg., Gynec. & Obst. **59**:415-440 (Sept.) 1934; (*d*) The Pathology of Ununited Fractures of the Neck of the Femur with Special Reference to the Head, J. Bone & Joint Surg. **21**:681-693 (July) 1939; (*e*) Sherman, M. S., and Phemister, D. B.: Pathology of Ununited Fractures of Neck of Femur, Ibid. **29**:19-40 (Jan.) 1947.

7. Potts, F. N., and Oldetz, B. E.: Aseptic Necrosis of Head of Femur Following Traumatic Dislocation, J. Bone & Joint Surg. **21**:101-110 (Jan.) 1939.

8. Hammond, G.: Oral report.

9. Wise, R. B.: Histological Study of Transcervical Fracture of Femur After Internal Fixation, J. Bone & Joint Surg. **23**:941-947 (Oct.) 1941.

men of a recently nailed hip that death of the head does not necessarily occur in a transcervical fracture and more important, defended internal fixation by the fact that the "vitallium" nail in itself is a factor in bringing new blood supply to the head along the tract of the nail.

In conclusion, avascular necrosis of the head of the femur following fracture may eventuate in (1) occasionally complete retransformation of the head to vital functioning structure; (2) aseptic necrosis characterized by a partial transformation of the head by creeping substitution with, however, collapse and fracture of the weight-bearing portion of the head at the junction of the advancing zone of repair; this complication might be avoided by recognition of the avascularity of the head between the second and third month by roentgen evidence of increased density of the head and then by protecting against weight bearing until transformation is complete; (3) degenerative arthritis characterized by loss of joint space due to necrotic cartilage; collapse of the head does not occur; this may be a complication from avascular necrosis which cannot be prevented; (4) nonunion; either a dead or a live head may result after fractures of the neck of the femur; this complication occurs with minimal frequency if satisfactory internal fixation is employed.

In spite of careful treatment, avascular necrosis is a serious complication of fractures of the neck of the femur which may result in a painful, poorly functioning hip of the aseptic necrosis or degenerative arthritis type.

SELECTION OF OPERATIVE THERAPY

The selection of operative therapy for these complications depends on the type of patient, the extent of the degeneration and the therapeutic choice of the surgeon.

Arthroplasty of the "vitallium" mold type has been successfully utilized by Smith-Petersen[10] and his associates in 42 cases with 85 per cent satisfactory results to the patient and to the surgeon. They employed the routine mold arthroplasty if minimal aseptic necrosis was present; a modified Whitman reconstruction operation if aseptic necrosis involved a large part of the head, removing the head and covering the trochanter with a "vitallium" mold; a modified Colonna reconstruction in nonunion with absorption of the neck, applying a "vitallium" mold and deepening the acetabulum.

Badgley[10] reported 3 excellent, 2 good and 2 fair results out of 9 cases with aseptic necrosis treated by "vitallium" cup arthroplasty.

The Mayo Clinic reported[11] that the results from arthroplasty for aseptic necrosis of the hip were disappointing. In more than half of their cases, results were poor.

The Colonna reconstruction operation[12] has been successfully employed. In our experience this is a far better procedure than arthrodesis of the hip, allowing stability and painless motion of some functional extent. Recently Wilson[13] has added a "vitallium" mold to a Whitman type of reconstruction.

Exponents of hip arthrodesis, however, feel that successful arthrodesis can be produced in this group with high frequency, particularly with the addition of the three-flanged nail fixation. Haggart[14] reported 22 successful results in degenerative arthritis out of 24 cases. Freiberg[15] has successfully fused several such hips by the method of Brittain.

Recently Venable and Stuck,[16] 1946, have reported a muscle flap transplant for the relief of painful aseptic necrosis of the hip. This concept of reestablishing blood supply by a muscle flap transplant is a courageous attempt to fight the ill effects of avascular necrosis which may prove to be of distinct value. They reported 27 cases in which this method was used, with striking relief of pain in all but 1 case. Time and experience only will prove the success or failure of this procedure.

10. Smith-Petersen, M. N.; Larson, C.; Aufrance, O., and Law, A. Complications of Old Fractures of Neck of Femur: Results of Treatment by Vitallium-Mold Arthroplasty, J. Bone & Joint Surg. 29:41-48 (Jan.) 1947.

11. Bickel, W. H.; Ghormley, R. K.; Coventry, M. B., and Mussey R. D., Jr.: Cup Arthroplasty of the Hip, Proc. Staff Meet., Mayo Clin 19:561-568 (Nov.) 1944.

12. Colonna, P. C.: Colonna Reconstruction Operation for Ununited Fractures of Neck of Femur, J. Bone & Joint Surg. 21:701-709 (July) 1939.

13. Wilson, P. D.: Trochanteric Arthroplasty in the Treatment of Ununited Fracture of the Neck of the Femur, J. Bone & Joint Surg. 29:822 (July) 1947.

14. Haggart, G. E.: Degenerative Disease of the Hip Joint Treated by Arthrodesis, in American Academy of Orthopaedic Surgeons Lectures on Regional Orthopaedic Surgery and Fundamental Orthopaedic Problems, Ann Arbor, Mich., J. W. Edwards, 1947, pp. 201-206.

15. Freiberg, J. A.: Experiences With the Brittain Ischio-Femoral Arthrodesis, J. Bone & Joint Surg. 28:501-512 (July) 1946.

16. Venable, C. S., and Stuck, W. G.: Muscle-Flap Transplant for Relief of Painful Monarticular Arthritis (Aseptic Necrosis) of Hip, Ann Surg. 123:641-655 (April) 1946.

FRACTURES OF THE HIP

Results Following Treatment

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Fractures about the hip joint may be seen in children and young adults but are injuries usually involving the aged. Approximately 80 per cent of these fractures occur in patients over 60 years of age. The fractures can be divided into two general classes—those involving the trochanteric region and those involving the neck of the femur. Both groups may be further divided into subclasses. These two types of fractures have several common characteristics. Each occurs in elderly persons, and both are more common in women (80 to 85 per cent) than in men. This is probably due to fact that women have a slightly wider pelvis with a tendency to coxa vara; they are usually less active and more prone to senile osteoporosis, and the life expectancy of a woman aged 60 is five years greater than that of a man.

Although the fractures are similar in some respects, they differ widely as to treatment and end results. The prognosis in the two fractures is entirely different in that nonunion is rarely seen in trochanteric fractures. This is due to several factors: The fractures of the neck involve a constricted area in the femur in which there is comparatively little cancellous bone; the periosteum of the neck of the femur is thin in elderly persons and there is no cambium layer.[1] The blood supply to the distal fragment is usually adequate, but

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From the Campbell Clinic.

1. Sherman, M. S., and Phemister, D. B.: The Pathology of Ununited Fractures of the Neck of the Femur, J. Bone & Joint Surg. 29:19-40 (Jan.) 1947.

the blood supply to the proximal fragment may be impaired or absent. In trochanteric fractures, a wide area of bone is involved, the major portion of which is cancellous, and both fragments have an adequate blood supply. As a result of impairment in blood supply, aseptic necrosis of the head of the femur and late degenerative changes of the femoral head are often seen after fractures of the neck of the femur. These complications have not been seen after trochanteric fractures. In trochanteric fractures, the surgeon may anticipate union in fair position if a method of treatment is employed that will prevent coxa vara. Our mortality rate (13. per cent) is higher in trochanteric fractures for three reasons: The average patient is slightly older (approximately two and one-half years); more trauma is required to produce the fracture, and if operative treatment is employed the operation is more extensive than that used in fractures of the neck of the femur. The chief problem in trochanteric fractures is to keep the mortality as low as possible by adequate medical and surgical treatment. To accomplish this, we prefer internal fixation. In the majority of cases, a Neufeld nail is employed. With successful internal fixation, the patient is allowed to sit up in bed or turn, or may be put in a wheel chair. Cleveland and co-workers[2] have estimated that the percentage of senile psychosis in elderly persons with trochanteric fractures is five times greater in those treated in body casts than in those treated by internal fixation. The mortality is less with internal fixation than with immobilization by means of a cast.

Fracture of the neck of the femur has been called "the unsolved fracture." In view of the present statistical studies, this should probably be changed to "the partially solved fracture." A year ago we studied and reported 300 complete, central fractures of the neck of the femur that had been nailed for one year or longer. Impacted fractures of the neck of the femur and pertrochanteric fractures were excluded. Only Pauwel's[3] type 2 and 3 fractures were included in the study. A report on these cases was made at the American Orthopedic Association.[4] Since that time we have added 60 additional hips, so that the present statistics are based on a series of 360 hips.

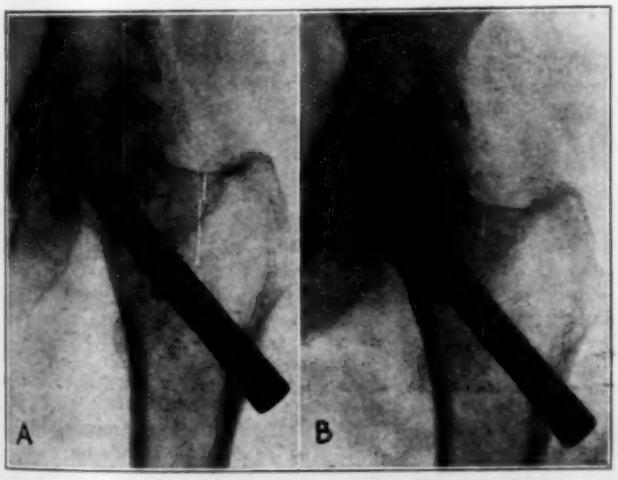

Fig. 1. A, 1 plus "arthritic changes" noted two and one-half years after nailing of a complete central fracture of the neck of the femur.
B, same hip six months later, showing 2 plus "arthritic changes."

2. Cleveland, M.; Bosworth, D. M., and Thompson, F. R.: Intertrochanteric Fractures of the Femur: A Survey of Treatment by Traction and Internal Fixation, read at the Fourteenth Annual Meeting of the American Academy of Orthopaedic Surgeons, 1947.

3. Pauwels, F.: Der Schenkelhalsbruch: Ein mechanisches Problem; Grundlagen des Heilungavorganges Prognose and kausale Therapie, Stuttgart, Ferdinand Enke, 1935, pp. 32 and 33.

MORTALITY

In calculating the mortality in the series previously reported, we included the known deaths up to six months following the operation. There has been some criticism regarding this method of calculating mortality. It is true that death may occur less than four weeks following the operation and still probably not be an operative mortality. Conversely, an operative mortality may occasionally occur more than four weeks after operation. In compiling statistics for this paper, all deaths have been included which occurred within four weeks of the operation. The over-all mortality is 7 per cent. Table 1 indicates the mortality for the various age groups. From the statistics seen in this table, it is noted that the prognosis as far as mortality is concerned is excellent for patients below 69 years of age. In patients 70 or above, the mortality rapidly rises by decades from 8 per cent to practically 43 per cent in the tenth decade.

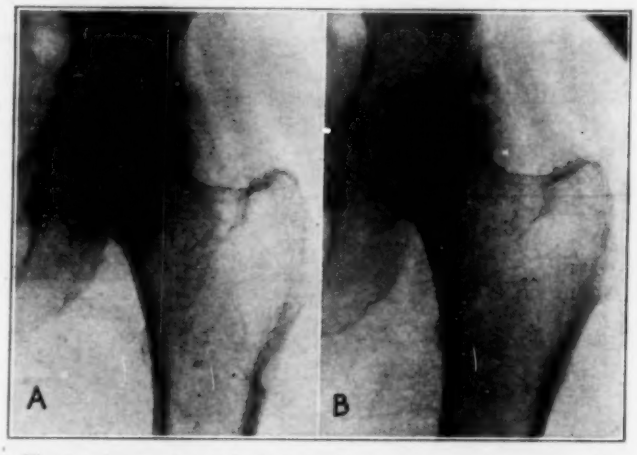

Fig. 2.—A, same hip as in figure 1 three years and three months following operation, showing 3 plus "arthritic changes."
B, same hip four years following operation, illustrating 4 plus "arthritic changes."

TABLE 1.—*Mortality in Fractures of the Neck of the Femur*

Age, Years	Hips	Deaths	Mortality, Percentage
Under 40	15	0	0
40-59	66	0	0
60-69	100	1	1.0
70-79	111	9	8.0
80-89	61	12	19.7
90-98	7	3	42.9
Total	360	25	7.0

The entire 360 hips were followed for a long enough period to determine the mortality. One hundred and fifty-eight hips, or 43.9 per cent, were followed less

TABLE 2.—*Fractures of the Neck of the Femur, Follow-up Study*

	Hips	Percentage
Follow-up less than 1 year	158	43.9
Follow-up over 1 year	177	49.1
Deaths	25	7.0
Total	360	100.0

4. Boyd, H. B., and George, G. L.: Complications of Fractures of the Neck of the Femur, J. Bone & Joint Surg. 29:13-18 (Jan.) 1947.

than one year. Follow-up studies were available on 177, or 49.1 per cent, of the hips for a one year period or longer. These statistics are shown in table 2.

PERCENTAGE OF BONY UNION

The percentage of bony union was determined on the patients followed one year or longer. In some of the patients, especially those in the lower age groups, one may occasionally see an unquestionable bony union in less than one year. On the other hand, in some cases bony union occurs after a year, especially in patients

Fig. 3—Acute complete central fracture of the neck of the femur immediately after reduction and internal fixation with Smith-Petersen nail.

that have gradual absorption of the neck of the femur. Table 3 shows the percentage of bony union and nonunion. In 177 cases there were approximately 85 per cent bony union and approximately 15 per cent nonunion.

TABLE 3.—*Fractures of the Neck of the Femur, Bony Union*

	Hips	Percentage
Union	150	84.7
Nonunion	27	15.3
Total	177	100.0

Of the 150 hips that obtained union, 15, or 10 per cent, showed absorption of the neck of the femur to the extent of 1 cm. or more. This indicates that absorption of the neck in itself does not preclude union provided that the nail gradually extrudes so that no actual space develops at the fracture site.

REASONS FOR NONUNION

It has been our impression that accurate reduction and proper nailing of the fragments influence union. This impression is substantiated by the fact that 72.5 per cent of the unions had good or excellent reductions and nailings; however, there was union in 27.5 per cent in which the reduction and nailing were fair or poor. In nonunion, 13 of the 27 were attributed to poor reduction, inadequate mechanical fixation or premature removal of the nail. The remaining 14 nonunions followed satisfactory reductions and nailings, but 2 were in patients with Paget's disease involving the head and the neck of the femur.

It has been felt that the greater shearing force exerted in the Pauwel type 3 fracture renders it more prone to nonunion. In this series, the percentage of nonunion for type 2 and 3 fractures is shown in table 4. There was no significant difference between the average age (less than one year) of type 2 and type 3 fractures. From these statistics, it will be seen that the

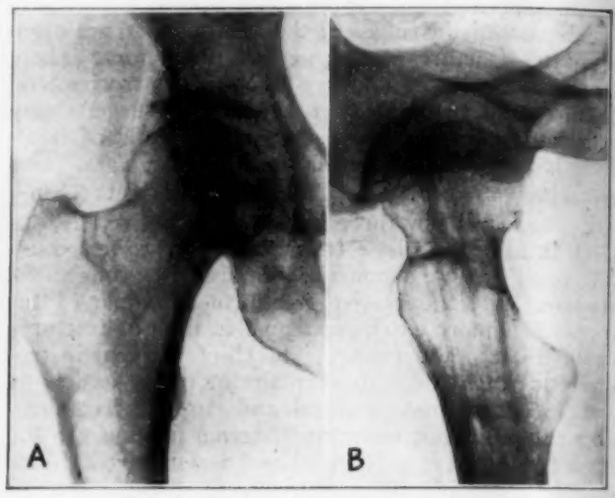

Fig. 4—Same hip as in figure 3 four years and four months following the operation, illustrating solid bony union without aseptic necrosis or arthritic changes.

percentage of nonunion in type 2 fractures is 16.5 per cent, while the percentage of nonunion in type 3 fractures is 10.5 per cent. It is true that the number of type 3 fractures is small, but still the difference is enough to be suggestive. With adequate internal fixation, the shearing force at the fracture line is probably eliminated. If the internal fixation accomplishes this, then one would expect type 3 fractures to unite in a higher percentage than type 2 fractures, as there is more osseous tissue in apposition. Without internal fixation, as in a Whitman cast, the shearing force cannot be entirely eliminated. Under these circumstances, nonunion would probably be higher in the type 3 fractures.

TABLE 4.—*Comparison of Union and Nonunion in Pauwel's Type 2 and Type 3 Fractures*

	Hips	Union	Nonunion	Nonunion Percentage
Type 2	139	116	23	16.5
Type 3	38	34	4	10.5
Total	177	150	27	15.3

Aseptic necrosis of the head of the femur was present in 32.6 per cent of the patients that obtained union, 59.3 per cent of the hips with nonunion showed aseptic necrosis. These data indicate that aseptic necrosis is a factor in the production of nonunion, but that it does not preclude union.

ARTHRITIC CHANGES

The percentage of arthritic changes is shown in table 5. There were 105 hips followed from one to two years. Of these, 15.7 per cent showed moderate ar-

TABLE 5.—*Arthritic Changes in Hips With Bony Union*

	Hips	Arthritic, Moderate, Percentage	Changes, Severe, Percentage
Follow-up 1-2 yr.	105	15.7	5.7
Follow-up over 2 yr.	45	22.2	33.3
Total	150		

47 hips with arthritic changes, 31.3%.

thritic changes, while 5.7 per cent showed severe arthritic changes. In the 45 hips with union followed two years or longer, these percentages increased to 22.2 per cent for moderate arthritic changes and 33.3 per cent for severe arthritic changes. These data show that there is an increase in the severity of the arthritic changes with time and use. In this study, the arthritic changes in the head of the femur were classified as 1 plus, 2 plus, 3 plus and 4 plus (figs. 1 and 2). In table 5, 1 plus and 2 plus arthritic changes are classified as moderate and 3 plus and 4 plus arthritic changes as severe. Slight roughening of the head of the femur was considered 1 plus arthritis. A slight depression and irregularity of the head of the femur was considered 2 plus. Moderate but definite collapse of the head was classified as 3 plus, and pronounced collapse with irregularity of the head was classified 4 plus. From a clinical point of view, we have observed that patients with moderate arthritic changes have slight pain in the hip but are able to walk rather well, either without support or with the use of a cane. Patients with severe arthritic changes have considerable pain and often require the use of a cane or crutches. When 4 plus arthritic changes are present, there may be more or less constant pain even at rest. Such a patient may be more disabled than one with a nonunion. Orthopedic surgeons have devised many operations for the treatment of nonunion following fractures of the neck of the femur. The treatment of these patients is still a definite problem. However, the statistics presented in this paper indicate that in patients followed two years or longer there will be a larger number with severe arthritic changes than with nonunion. Accordingly, in the future it will be necessary for us to direct our attention toward the treatment of this unfortunate complication, as we have toward nonunion in the past.

CONCLUSIONS

The mortality in 360 fractures of the neck of the femur has been 7 per cent. The mortality varied from 0 in the sixth decade to 42.9 per cent in the tenth decade.

Bony union occurred in 84.7 per cent of the patients followed for one year or longer. In our experience, Pauwel's type 3 fractures have not shown a predisposition to nonunion as compared with type 2.

The incidence of aseptic necrosis is higher in patients with nonunion than in those with union, approximately 60 per cent in the former and 33 per cent in the latter.

Arthritic changes following bony union gradually increase in percentage and severity with time and use until the percentage of severe arthritic changes in patients followed two years or longer represents approximately one third of the cases. After the use of internal fixation, the percentage of patients in whom severe arthritic changes develop will exceed the number with nonunion. Consequently, the development of methods for the treatment of severe arthritic changes following union assumes even more importance than the treatment of nonunion.

While the data presented in this paper appear discouraging, this does not alter the fact that internal fixation is the treatment of choice for acute fractures of the neck of the femur. The mortality is lower, the patient is more comfortable, medical complications are less frequent, the percentage of senile psychosis is greatly reduced, the cost of hospitalization is diminished and the percentage of bony union is greater than with any other method.

TREATMENT OF UNUNITED FRACTURES OF THE NECK OF THE FEMUR

JAMES A. DICKSON, M. D.
Cleveland

As the other speakers in this symposium have pointed out, modern conceptions of treatment of fractures of the neck of the femur are focusing on the importance of elimination of shearing force on the fractured surfaces and of maintenance of circulation to the head in producing satisfactory results. The use of internal fixation has increased the number of cases in which union is obtained from about 50 to 80 per cent, but there is growing recognition that this method has not entirely solved the problems presented by intracapsular fractures, and increasing attention is now being paid to functional results. Nonunion results after simple nailing in about 18 to 20 per cent of cases, and atrophy of the head and arthritic changes also occur in another large group in which the fracture unites, so that treatment is actually unsuccessful from the functional point of view in about 35 to 50 per cent of intracapsular fractures of the femur.[1]

Those cases in which nonunion is associated with pronounced aseptic necrosis and absorption of the head and secondary arthritis changes, for which the treatment to be considered lies between a reconstruction operation or an arthrodesis of the hip, will not be dealt with at this time. This discussion of treatment of ununited fractures of the femoral neck will be confined to those cases in which it would seem possible and feasible to restore anatomic and physiologic function to the hip joint. Fortunately, the greater proportion of patients with ununited fracture of the femoral neck are reasonably suitable candidates for further surgical care. When it is recognized that nonunion is developing this fact should be accepted immediately and an appropriate operation for correction carried out. When nonunion once starts, it almost invariably goes from bad to worse, and the longer operation is delayed, thus allowing atrophic changes to develop in the head, the more problematic the end results of secondary treatment. The earlier the oper-

Read in a panel discussion on Fractures of the Upper End of the Femur before the Section on Orthopedic Surgery at the Ninety-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1947.

From the Cleveland Clinic and the Frank E. Bunts Educational Institute.

1. (a) Boyd, H. B., and George, I. L.: Complications of Fractures of the Neck of the Femur, J. Bone & Joint Surg. 29:13-18, 1947. (b) Linton, P.: On the Different Types of Intracapsular Fractures of the Femoral Neck: A Surgical Investigation of the Origin, Treatment, Prognosis and Complications in Three Hundred Sixty-Five Cases, Acta chir. Scandinav. (suppl.) 90:1—122, 1944. (c) Eyre-Brook, A. L., and Pridie, K. H.: Intracapsular Fractures of the Neck of the Femur: Final Results of Seventy-Five Consecutive Cases Treated by the Closed Method of Pinning, Brit. J. Surg. 29:115-139, 1941. (d) Fracture Committee of American Academy of Orthopaedic Surgeons; Treatment of Fractures of the Neck of the Femur by Internal Fixation, J. Bone & Joint Surg. 21:483-496, 1939.

ation is performed after nonunion has been established, the better the results that can be expected. With a better understanding of the basic principles involved in the causation, with consequent earlier recognition and treatment of beginning nonunion, it is hoped that many of the more extensive reconstruction procedures can be avoided, or at least that the need for them can be greatly minimized.

The factors of mechanics and circulation—which are closely interrelated—are of utmost significance in planning treatment of fractures of the neck of the femur which have failed to unite. In these instances, as has been demonstrated by the investigations of Pauwels,[2] Linton[1b] (fig. 1) and Evre-Brook and

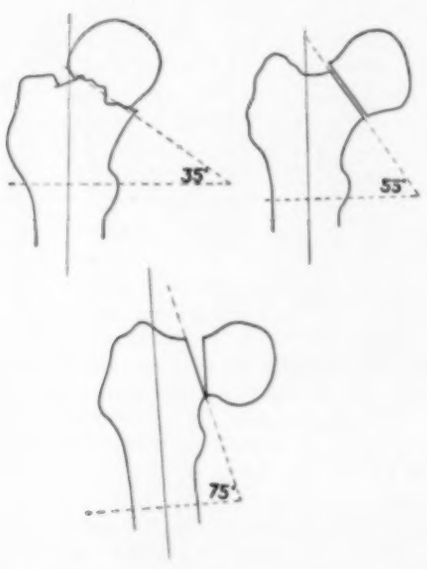

Fig 1.—Mechanical analysis of fractures at the neck of the femur, according to Linton.[1b]

Pridie,[1c] the mechanical factors are unfavorable, in that the angle of the fracture tends toward the vertical—when measured in relation to the femoral shaft—the fracture is not impacting, and shearing force tends to produce instability and pull the fractured surfaces apart. In a large proportion of these cases, also, roentgenograms show increased density of the head as compared with the femoral shaft, a finding indicating that blood supply to the amputated head is inadequate or lacking and that this portion of the bone is undergoing aseptic necrosis. Whether or not this bony change occurs in the head depends on the degree of interruption of the blood supply, which is determined by the position of the fracture within the capsule as well as the angle of the fracture. When circulation is preserved in both fragments, and the fracture is in an impacting position, then union results, and aseptic necrosis of the head rarely occurs. When circulation of the head fragment is greatly impaired, then union is delayed, and if the process is too slow, aseptic necrosis of the head may develop. In some cases in which shearing strain may prevent union, the amputated fragment of the head may remain viable because of blood supply received through the capsular vessels and perhaps the ligamentum teres.[3] However, it is well established that the principal blood supply to the head of the femur is by way of the medullary vessels which pass through the neck. In the treatment of ununited fractures, then, the earlier this main source of blood supply can be restored through the neck by impaction of the fracture and stimulation of osteogenesis and revascularization, the better the results should be.

BONE GRAFTING AND OSTEOTOMY

In the treatment of ununited fractures in other parts of the skeletal system, it has long been recognized that satisfactory results depend on correction of faulty mechanics and stimulation of osteosynthesis by bone grafting. In the treatment of ununited fractures of the neck of the femur, however, reliance has been placed in the past on bone grafting procedures which did not take into account the mechanical factor largely responsible for the nonunion or on osteotomy procedures attempting to place the fracture in an impacting position, which did nothing to replace the fibrous tissue that had formed at the fracture site or to facilitate osteogenesis and revascularization of the head.

Hence bone grafting and osteotomy are both only partial remedial procedures, in that each fails to take into account the whole problem presented by ununited fractures of the neck of the femur. Nevertheless, both methods have produced satisfactory results in a certain proportion of cases. Hence there has been a tendency for the individual surgeon, on the basis of his experience, to develop a preference for one or the other. This empiric attitude has undoubtedly been responsible for many failures by both methods since it has failed to recognize the fact that a certain proportion of cases in which bone grafts are used will result in failure when shearing force on the fracture line remains great and—conversely—that an osteotomy will not be successful when the desired impaction is not obtained because of lack of accurate control of the rotation of the head or when the degenerative fibrous process at the fracture site has progressed so that circulation cannot be reestablished through the neck to stimulate osseous repair.

The principal technics used for bone grafting in ununited fractures of the femoral neck

2. Pauwels, F.: Der Schenkelhalsbruch: Ein mechanisches Problem; Grundlagen des Heilungsvorganges Prognose und kausale Therapie, Stuttgart, Ferdinand Enke, 1935.

3. *(a)* Wolcott, W. E.: Circulation of the Head and Neck of the Femur: Its Relation to Nonunion in Fractures of the Femoral Neck, J. A. M. A. 100:27-34, (Jan. 7) 1933; *(b)* Evolution of Circulation in the Developing Femoral Head and Neck: An Anatomic Study, Surg., Gynec. & Obst. 77:51-59, 1943.

are those described by Albee, Henderson [5] Gallie,[6] Compere[7] and myself.[8] Bone grafting technics are much alike in principle; the differences consist largely in the source of the bone used; i. e., tibia, fibula or ilium; whether the grafts are single or multiple; the site of insertion of the graft; the type of incision and exposure used in performing the the operation, and whether or not the graft is accompanied by some method of internal fixation.

The aim of all bone grafting procedures is to replace fibrous growth by formation of new bone, stimulated by transplantation of healthy bone into the area of degenerative change. If shearing force is not too great, and if the graft is well placed so as to aid in overcoming instability of the fracture, satisfactory results may depend partially on this mechanical factor. However, even in cases in which osteogenesis is stimulated satisfactorily, the results of the operation may be unsuccessful because the mechanical fault has not been corrected and the new bone is subjected to the same stresses that caused or contributed to the nonunion of the fracture originally.

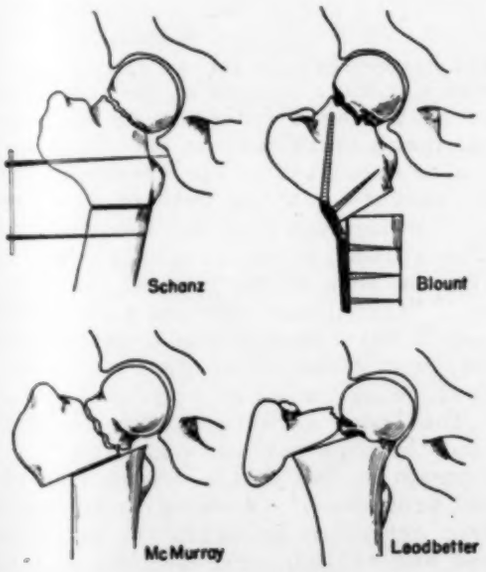

Fig 2.—Various types of osteotomy procedures for ununited fractures of the neck of the femur.

Nearly all who have used bone grafting procedures have recognized that such operations were not suitable in all cases. In general, the tendency has been to confine the use of bone grafting to patients in younger age groups. Usually bone grafting is regarded as a suitable procedure in only about 10 per cent of patients with ununited fractures of the femoral neck.[9] Published results show that operations of this type result in union in only about two thirds of this selected group of cases.[10]

The purpose of various types of osteotomy (fig. 2) is to correct the mechanical fault that is preventing impaction and to produce a stable hip.[11] In the Schanz,[11c] or wedge, osteotomy, shearing force is often overcome, giving greater stability to the hip joint, but it often does not result in union, and causes considerable loss of leg length.[12] The McMurray,[11f] or high oblique, osteotomy is now considered preferable to the Schanz procedure by most orthopedic surgeons. With this operation, union of the osteotomy surfaces occurs, thus yielding a stable hip even in cases in which nonunion between the head and neck of the femur persists. The shortening of the leg following this operation, although it may be considerable, is not so great as with the wedge osteotomy. The principal difficulty with the McMurray osteotomy is lack of definite control of the head of the femur and upper trochanteric segment and their proper placement when the shaft of the femur is displaced medially. In many instances, the head of the femur is not rotated sufficiently and the fragments are not correctly placed to facilitate bony union and repair. Impaction of the fragments is relied on entirely to break down the fibrous scar tissue, and when much scar tissue is present, or when sufficient impaction is not procured, union cannot occur. Unfavorable results with osteotomy alone, in the presence of a "dead" head, were undoubtedly due to the fact that union was not procured between the shaft and the head and consequently there was never any possibility that the head might become revascularized.

4. Albee, F. H.: The Bone Graft Peg in Treatment of Fractures of the Neck of the Femur, Ann. Surg 62:85-91, 1915.

5. Henderson, M. S.: Bone Graft for Ununited Fractures of the Hip. Proc. Staff Meet., Mayo Clin. 6:17-19, 1931.

6. Gallie, W. E., and Lewis, F. L.: Ununited Fractures of the Neck of the Femur in the Aged, J. Bone & Joint Surg. 22:75-80, 1940

7. Compere, E. L., and Lee, J.: The Restoration of Physiological and Anatomical Function in Old Ununited Intracapsular Fractures of the Neck of the Femur, J. Bone & Joint Surg. 22:251-277, 1940.

8. Dickson, J. A.: Treatment of Ununited Fractures of the Neck of the Femur by Means of a Bone Graft and Smith-Petersen Nail, S. Clin. North America 19:1235-1241, 1939

9. Henderson, M. S.: Ununited Fractures of the Neck of the Femur: Treatment by the Aid of a Bone Graft, J. Bone & Joint Surg. 22:259-297, 1940.

10. Henderson,[5] Gallie and Lewis,[6] Compere and Lee.[7]

11. *(a)* Linton,[1b] *(b)* Pauwels,[2] *(c)* Schanz, A.: Ueber die nach Schenkelhalsabrüchen zurückbleibenden Gehstörungen, Deutsche med. Wchnschr. 51:730-732, 1925. (d) Schumm, H.C.: The Schanz Osteotomy for Fractures of the Neck of the Femur, J. Bone & Joint Surg. 19:955-963, 1937. *(e)* Reich, R. S.: Ununited Fractures of the Neck of the Femur: Collective Review, Surg., Gynec. & Obst. 83:105-112, 1946. *(f)* McMurray, T. P.: Ununited Fractures of the Femoral Neck, J. Bone & Joint Surg. 18:319-327, 1936. *(g)* Reich, R. S.: Ununited Fractures of the Neck of the Femur: Treatment by High Osteotomy, ibid. 23:141-158, 1941. *(h)* Speed, J. S., and Smith, H.: Trochanteric Osteotomy for Ununited Fractures of the Neck of the Femur, South. M. J. 34:798-805, 1941. *(i)* Blount, W.: Blade Plate Internal Fixation for High Femoral Osteotomies, J. Bone & Joint Surg. 25:319-329, 1943. *(j)* Dawkins, A. L.: Treatment of Recent Fractures of the Neck of the Femur by Subtrochanteric Osteotomy, Australia & New Zealand J. Surg. 10:244-249, 1941. *(k)* Jones, E.: Trochanteric Transplantation in Treatment of Fractures of the Neck of the Femur, J. Bone & Joint Surg. 14:259-265, 1932. *(l)* Key, J. A.: Internal and External Fixation of High Osteotomies, ibid. 25:737-744, 1943. *(m)* Leadbetter, G. W.: Cervical-Axial Osteotomy of the Femur: Preliminary Report, ibid. 26:713-720, 1940.

12. Linton,[1b] Schumm,[11d] Reich.[11e]

The Leadbetter[11a] cervical-axial osteotomy overcomes some of the difficulties of the McMurray procedure in that the osteotomy is done under direct vision and greater leg length is procured than with the other types. However, there is still lack of control of the degree of rotation of the fragments, and, except in early cases, in which operation is performed before much fibrous tissue has developed at the fracture site, the procedure is carried out with considerable difficulty.

Although the Brackett operation[13] is a reconstruction procedure, it rests on essentially the same principles as osteotomy, since its aim is to correct the mechanical fault and to remove the shearing stress from the fracture site. It has the additional advantage that it removes fibrous tissue at the fracture and thus attempts to "freshen" the bone for healing. Although this procedure is preferred to osteotomy by some surgeons,[14] and although in my hands it has produced some satisfactory results, I agree with Watson-Jones[15] that it is not to be recommended because the extensive dissection required produces much greater interference with circulation than does osteotomy, and thus may inflict further injury on an already damaged blood supply.

Thus a critical analysis of my own results with various procedures used in treatment of ununited fractures of the neck of the femur and a review of the literature reporting the different bone grafting, osteotomy and reconstruction procedures show that, although results are satisfactory in some instances, the proportion of failures is remarkably similar with all methods, amounting rather generally to 35 to 50 per cent of all cases subjected to secondary procedures.

This led to the idea that if the advantages of the various procedures could be combined, with aim of correcting faulty mechanics and restoring circulation and stimulating formation of bone in a single operation, perhaps these results might be improved. Examination of a series of roentgenograms of ununited fracture of the femoral neck showed that in most instances there was a downward rotation of the head of about 60 degrees. Furthermore, measurement of the angle of the fracture line in relation to the femoral shaft, by Linton's method, showed that in all instances this was high, i. e., over 65 degrees, and hence would fall in the group classification of Pauwels[2] and Linton[15]; this is the group in which shearing force is greatest and mechanical factors are most unfavorable to union.

In planning the treatment of ununited fractures, it thus seemed evident that if the upper part of the shaft and head were rotated 60 degrees, the head of the femur would assume its normal relationship within the acetabulum, and the mechanical stress in the fracture line would be changed so that the fracture would have the advantage of impaction to stimulate union. That is, according to Linton's classification, it would be changed from group 3 to group 1, for the angle of inclination of the fracture would be changed from 65 degrees or over to less than 30 degrees. Thus, according to modern concepts, a controlled osteotomy is essential in the treatment of nonunion of fracture of the femoral neck.

In view of the fact that elsewhere in the skeletal system results of treatment of ununited fractures depend not only on the correction of mechanical faults but also on bone grafting to stimulate osteogenesis, it is logical and desirable that this 60 degree rotation of the head and trochanteric segment should be combined with bone grafting to stimulate osteogenesis. A bone graft gives added stability across the fracture and acts as a guide to formation of granulation tissue and aids revascularization of the head. This facilitates blood supply from the trochanteric segment to the head and leads to more rapid healing. Hence it is obvious that bone grafting is also essential in the treatment of ununited fractures at the neck of the femur. The use of cancellous bone for the graft taken from the ilium is important, as has been shown by the work of Abbott and his collaborators.[16] "Cancellous bone has a loose structure, with interlacing and branching trabeculae, every one of which is covered by endosteal cells, and has high osteogenetic power. The loose structure also permits of early and thorough revascularization."

This reasoning led to the development of the combined procedure,[17] consisting of the high geometric osteotomy in which the rotation of the head and trochanteric segment is accurately and consistently controlled and brought into a position of maximal impaction, with insertion of a bone graft from the ilium to stimulate osteogenesis and revascularization.

TECHNIC

The method employed to procure an osteotomy that will assure a 60 degree rotation and bring the fractured surfaces into a position of impaction is illustrated in figures 3 and 4. The operation is

13. Brackett, E. G.: Fractured Neck of the Femur: Transplantation of Femoral Head to Trochanter; Report of a Case Eight Years After Operation, Boston M. & S. J. 192:1118-1120, 1925.

14. Rowe, M. L., and Ghormley, R. K.: Brackett Operation for Ununited Fractures of the Neck of the Femur, J. Bone & Joint Surg. 25:249-255, 1944. Magnuson, P. B.: Fractures of the Neck of the Femur: Evaluation of Various Methods Advanced for Treatment, J. A. M. A. 107:1439-1445 (Oct. 31) 1945.

15. Watson-Jones, R.: Fractures and Joint Injuries, ed. 3, Baltimore, Williams & Wilkins Co., 1944, vol. 2. p. 660.

16. Abbott, L. C.; Schottstaedt, E. R.; Saunders, J. B. D. M., and Bost, F. C.: Evaluation of Cortical and Cancellous Bone as Grafting Material: A Clinical and Experimental Study, J. Bone & Joint Surg. 29:381-414, 1947.

17. Dickson, J. A.: The High Geometric Osteotomy with Rotation and Bone Graft for Ununited Fractures of the Neck of the Femur: A Preliminary Report, J. Bone & Joint Surg., to be published.

17a. Since this paper was presented the technic has been modified: a single curved lateral incision between the tensor fascia femoralis and the gluteus medius muscles or an anterior femoral incision is used.

carried out through two incisions.[17a] A lateral incision, 7 to 8 inches (17.8 to 20.3 cm.) long, extends downward from the prominence of the greater trochanter. The outer surface of the bone is exposed

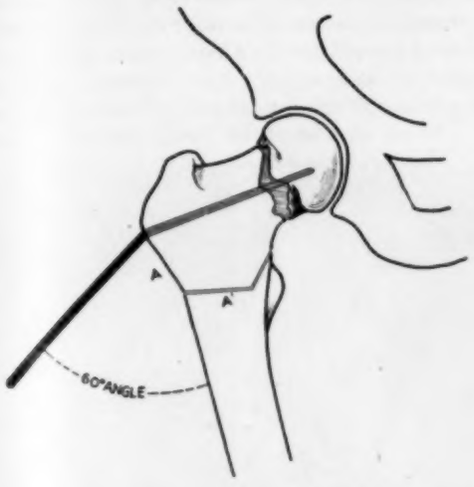

Fig 3.—Site for geometric osteotomy and control of upper segments by blade plate.

subperiosteally, and a bed prepared for insertion of a blade plate. Then a Smith-Petersen incision is made to expose the hip joint from the front. The rectus femoris is reflected downward allowing full exposure of the anterior surface of the femur. The joint capsule is opened and the incision carried outward with medial reflection of the muscles anterior to the femur.

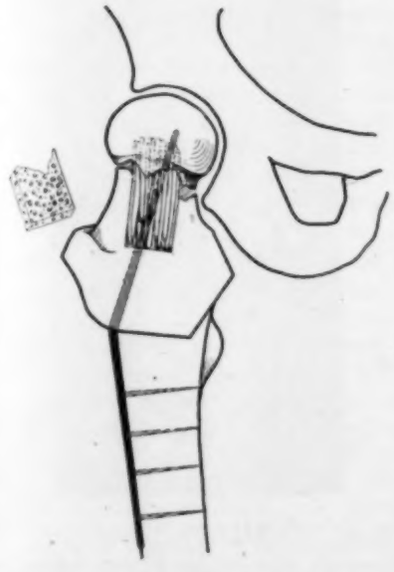

Fig 4.—Position of osteotomy after rotation and placement of bone graft.

To assure control of the head and trochanteric segments, these are transfixed by a blade plate, extending from the prominence of the greater trochanter well into the lower half of the head. A guide wire is first placed from a point about ½ inch (1.3 cm.) above the prominence of the greater trochanter into the center of the head. Then the blade plate is suitably bent so that when the blade is inserted parallel to the guide wire, the plate will extend outward from the shaft at a 60 degree angle. This is readily accomplished with the aid of a protractor. With the blade plate properly placed, the osteotomy site is then determined. In order to procure the desired rotation, the osteotomy should be cut to simulate the sides of a regular hexagon (fig. 3). Then when rotation is carried out (fig. 4) and the side A comes to A^1, the segments will fit accurately, the desired rotation of 60 degrees will be accomplished and the plate will fit along the shaft of the femur.

The osteotomy site is determined by measuring with a caliper (fig. 5) the distance from where the blade enters to the lesser trochanter. This gives the diameter of the marking chisel which is chosen from a set of six semihexagonal chisels. When the proper-sized marking chisel is used and placed on the front of the femur with the diameter extending from the entrance of the blade plate to the lesser

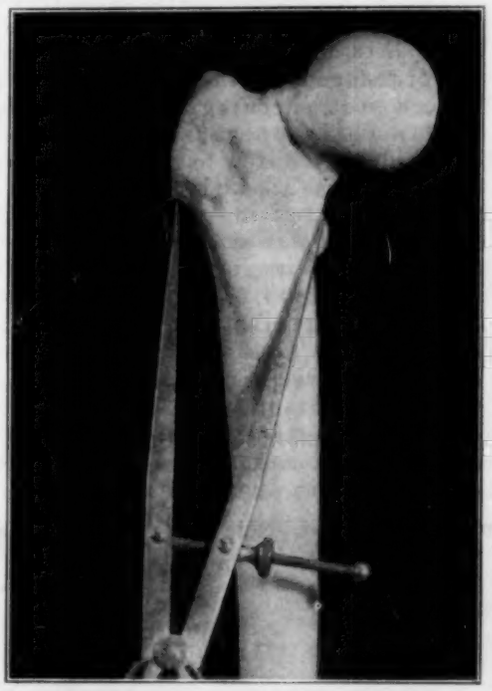

Fig 5.—Estimation of size of marking chisel to be used for osteotomy, from the point of insertion of the blade plate to the lesser trochanter.

trochanter, one side of the marker extends beyond the flare of the trochanter. If the chisel is now rotated slightly so that one side runs parallel to the flare of the trochanter, extending downward from the entrance of the blade plate, the site of the osteotomy can be marked. This brings the inner blade out just above the lesser trochanter, thus assuring a high osteotomy. If too small a marker is chosen, the osteotomy will extend into the neck, and much of the support of the head segment will be lost. If too large a chisel is used, then the osteotomy will come out below the lesser trochanter, and the impacting force of the psoas will not be procured. The measurement determining the choice of the proper marking chisel is extremely important, in order to obtain optimal results from the osteotomy.

When the osteotomy and rotation have been completed, a window is made in front of the trochanteric segment just distal to the fracture site (fig. 4). This readily allows removal of sclerotic bone and fibrous tissue and curettement up into the head to facilitate placement of the graft. Numerous chips of cancellous bone from the ilium are impacted well across the fracture line, and one large graft is then fixed into position to give added stability. The window removed can be replaced.[8] As has already been mentioned, cancellous bone is used because it has superior osteogenetic power.

Internal rotation is maintained in balanced traction, or with a plaster boot and bar, for six to eight weeks; then the patient is allowed up on crutches, with no weight bearing for a period of months. Roentgenograms are made as progress studies from time to time, and protection is continued until there is evidence that the head is throughly revascularized.

COMMENT

Fortunately, this rotation osteotomy results in equalization of leg length, and the greater the varus deformity before operation, the greater the length procured (fig. 6). Full details of the effect of the geometric osteotomy on leg length have been reported previously.[17] This approach to the treatment of ununited fractures of the neck of the femur has produced most encouraging results. In the 10 cases in which operation has been performed, solid bony union has been procured in 9. The one case in which union has not occurred has resulted in a good, stable, functioning hip. This was one of the early cases in the series, and it is believed that insufficient attention was given to the placement of the graft in this instance. Figure 7 illustrates the results obtained.

The cases dealt with in this series have not been "favorable" cases, in that the nonunion has been of long standing in most of them, and, in several, roentgenograms have indicated increased density in the head fragment, indicating considerable degree of aseptic necrosis. In these instances, there is roentgenographic evidence that healthy bone has formed in the head, which indicates that there has been reestablishment of circulation to the head through the medullary vessels of the neck as a result of the combined operation.

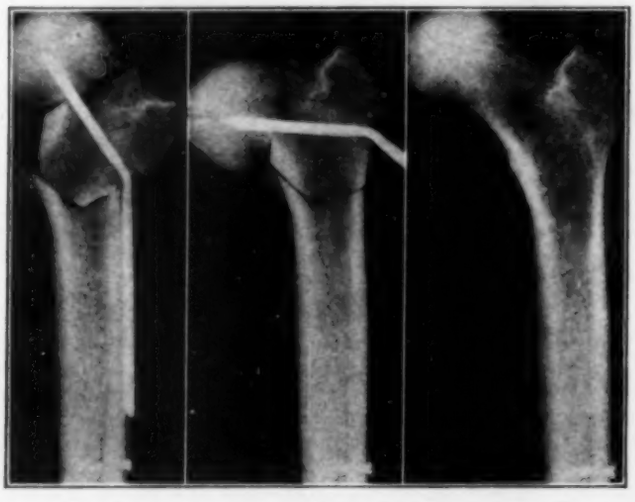

Fig 6.—Equalization of leg length by geometric osteotomy.

As these cases indicate, and as others have also shown after bone grafting[7] and after osteotomy procedures,[18] a so-called dead head can be revascularized and returned to a normal state both roentgenlogically and functionally. These findings naturally suggest that perhaps orthopedic surgeons should question carefully the present concepts regarding necrotic heads after femoral neck fractures. This is a controversial problem because, according to some orthopedic surgeons, the roentgenographic findings and the duration of nonunion in the cases shown would have been interpreted as

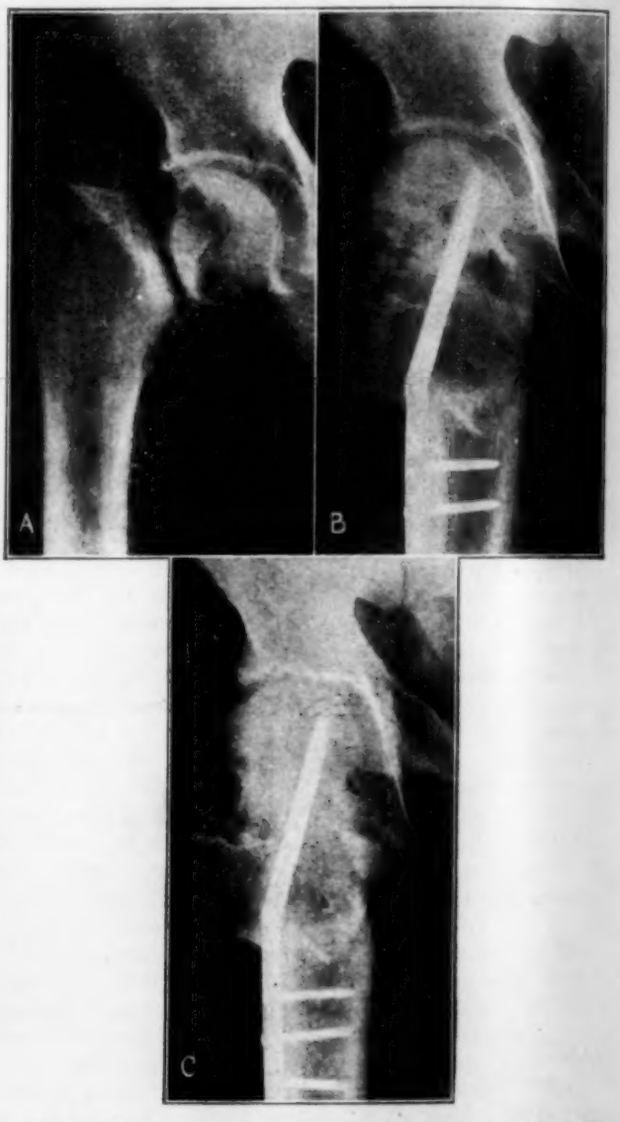

Fig 7.—(A) Preoperative anteroposterior roentgenogram of ununited fracture of femoral neck in a man, 42, twenty-one months after injury. Note roentgenographic evidence as the "dead" head. (B) postoperative anteroposterior roentgenogram of same patient, showing union and evidence of revascularization of head, six months after operation. (C) anteroposterior roentgenogram of same patient, showing solid bony union and regeneration of healthy bone in the head, eleven months after operation.

criteria indicating the need for a reconstruction operation of the Whitman or Colonna type, with removal of the head. These operations are unquestionably necessary in some instances, and there is no intent to imply that all cases of ununited fractures of the femoral neck should be treated by the combined procedure here described. However, there is now considerable difference of opinion as to what

18. (a) Linton,[1b] (b) Phemister, D. B.: The Pathology of Ununited Fractures of the Neck of the Femur with Special Reference to the Head, J. Bone & Joint Surg. 21: 591-593, 1939. (c) Sherman, M. S., and Phemister, D. B.: The Pathology of Ununited Fractures of the Neck of the Femur, ibid. 29:19-40, 1947.

constitutes a "dead" head and as to the procedures that may be effective in the presence of roentgenographic evidence of aseptic necrosis. Wolcott[3a] reported that pathologic examination of three femoral heads, removed in performing Whitman reconstruction procedures, which had shown definitely increased roentgenologic density in relation to the femoral shaft, proved that in none of them was there complete necrosis of bone.

At this point, it seems desirable to question the practice of sacrificing all so-called dead heads, as is recommended by some. It must be admitted that at present our knowledge is not sufficiently definite to permit the formulation of any dogmatic dictums regarding these cases. Nevertheless, if surgeons free themselves from rigid, perhaps erroneously pessimistic conceptions as to the potential viability of femoral heads which have been amputated by ununited fractures, it may be that many such heads, which are now sacrificed because of such conceptions, may be saved. It would seem wise to assume a cautious and conservative attitude toward removal of "dead" heads, since, according to the facts cited, there is possibility for regeneration of bone in a large proportion of these cases.

If this conservative attitude is assumed, one must not lose sight of the fact that although there may be some question as to the degree of vascular damage there is no question that the nutrition of heads which show increased density on the roentgenogram has been impaired. This means, as Phemister[18bc] has emphasized, that such a head must be protected from trauma incident to weight bearing for a prolonged period—at present just how long is not known—while the new bone is forming. For it seems inevitable that if the head is not protected during this period of regeneration, atrophic and arthritic changes will occur.

If time proves that despite the evidences of regeneration in these heads there is eventual atrophy in some of them, then, with the type of osteotomy here used, arthroplasty[19] with the "vitallium" cup, as described by Badgley, can still be employed. This would not be possible after other types of osteotomy. If this is not feasible in a particular case, then a Whitman[20] or Colonna[21] reconstruction operation, or an arthrodesis, as recommended by Gill[22] for cases in which the head is collapsed, could be performed.

Since the combined operation has resulted in evidence of regeneration and revascularization of bone in roentgenologically "dead" heads in cases of two and three years' duration, it seems logical to assume that the treatment might be expedited and the results more certainly favorable in earlier cases of nonunion. From what is now known of the effect of unfavorable shearing stress and of circulatory impairment in the causation of nonunion and of atrophic changes in the head, it is to be expected that a rationale may be developed, aiming toward the prevention of many of these complications of fractures at the femoral neck.

The mechanical analysis of the fracture angle in relation to impaction and the position of the fracture in relation to the interruption of blood supply furnish an approach toward classification and prognosis of cases at the time the fracture occurs. In cases in which preliminary study indicates that impaction is unlikely to occur with simple nailing, then some type of operation designed to bring about impaction and stability of the fracture should be performed as a primary procedure. Bone grafting has been recommended[23] for this purpose, and also osteotomy.[24] It may be that bone grafting will be effective through stimulation of osteogenesis and in adding sufficient stability in some such fractures to prevent nonunion. From the standpoint of basic principles, however, it would appear that a controlled osteotomy would be preferable to any type of bone grafting in overcoming the mechanical factors most unfavorable to union[25].

It might be, with proper selection of cases and of the primary procedure best suited to the individual case, that development of nonunion and also of atrophic changes might be largely avoided. If so, this would be a big step forward in the treatment of ununited fractures of the neck of the femur, since an ounce of prevention is worth a pound of cure. When nonunion is evident, it is important that combined osteotomy and bone-grafting operation be performed as early as possible. Slipping of the fractured surfaces is usually discerned on the roentgenogram within the first few weeks, and in the vast majority of cases in which this occurs the situation progresses steadily and there is eventual nonunion. If union does occur in such cases, it is long delayed and is usually accompanied by severe atrophic changes. In these cases, instead of waiting and hoping blindly for a favorable outcome, which almost

19. Smith-Petersen, M. N.; Larson, C. B.; Aufranc, O. E., and Law, W. A.: Complications of Old Fractures of the Neck of the Femur: Results of Treatment by Vitallium-Mold Arthroplasty, J. Bone & Joint Surg. 29:41-48, 1947. Wilson, P. D.: Trochanteric Arthroplasty in the Treatment of Ununited Fractures of the Femur, ibid, 29:313-326, 1947.

20. Whitman, R.: Reconstruction Operation for Ununited Fracture of the Neck of the Femur, Surg., Gynec. & Obst. 32:479-485, 1921. Krida, A.: The Whitman Reconstruction Operation for Complications of Fracture of the Neck of the Femur, J. Bone & Joint Surg. 29:310-312, 1947.

21. Colonna, P.: A New Type of Reconstruction Operation for Old Ununited Fractures of the Neck of the Femur, J. Bone & Joint Surg. 17:119-122, 1935.

22. Gill, A. B.: Arthrodesis of the Hip for Ununited Fractures, J. Bone & Joint Surg. 29:305-309, 1947.

23. Eyre-Brook and Pridie.[1c] Albee, F. H.: Autogenous Bone Graft Peg as Primary Treatment for Fractures of the Neck of the Femur, Internat. J. Med. & Surg. 44: 505-571, 1931. Inclan, A.: Late Complications in Fracture of the Neck of the Femur Treated by Nailing, Bone Grafting or Both, J. Internat. Coll. Surgeons 9:36-50, 1946. Bado, J. L.: Report on Fractures of the Neck of the Femur, read at the Annual Meeting of American Academy of Orthopaedic Surgeons, Chicago, 1947.

24. Linton.[1b] McMurray, T. P.: Fractures of the Neck of the Femur: Oblique Osteotomy, Brit. M. J. 1:330-333, 1938. Dawkins.[11j]

25. Dickson, J. A.: The Mechanical Factor in Fractures of the Neck of the Femur, with a Suggestion for the Treatment of Fresh Fractures, to be published.

never happens, the secondary operation should be performed immediately, assuming that the patient's general condition warrants it. This would establish impaction and revascularization and regeneration of bone before all the troublesome fibrosis and atrophic changes have occurred to complicate the situation.

If surgeons reorient their conceptions of the problem of nonunion of fractures of the neck of the femur in this direction—that is, toward early recognition of unfavorable mechanical and circulatory factors, and institute prompt treatment by means of the combined operation, it seems probable that the results in this type of case would be greatly improved.

ABSTRACT OF DISCUSSION

On Papers by Drs. Van Gorder; Cleveland, Bosworth and Thompson; Freyberg and Levy; Badgley and Denham; Boyd and George; and Dickson.

DR. J. R. MOORE, Philadelphia: Dr. Van Gorder has covered the fundamentals essential to the successful treatment of this type of fracture. It is important to recognize in these patients the important part that pain plays prior to reduction, which one might term as a complete change in personality. The patient becomes morose, depressed, psychotic. These findings, coupled with the general changes concommitant with age, suggest poor mental and physical health and delay surgical treatment. A vicious circle develops. The patient becomes totally invalided, suffers from complete enforced immobilization and the pain factor. A complete physical examination is essential and a roentgenogram of the chest is advisable as a matter of routine. The observations rarely delay a reduction legitimately. Adequate therapy, of course, should be employed to meet the coexisting conditions, complications in connection with surgical treatment. After the fixation of the fracture, a dramatic change in personality and general physical being occurs which bears out beyond question the significance of the pain element. The second point which I wish to emphasize deals with the method of reduction. Gentleness is essential. Violent maneuvers are unwarranted and only serve to rotate the head, perhaps even rupture the capsule or tear the blood supply attachment to the head fragment. The simple method of pulling both extremities gently to length, holding the pelvis firmly in the normal transverse axis, then gently internally rotating the fractured extremity until the internal rotation matches up with the internal rotation present on the opposite side and finally mildly abducting for a few degrees for locking brings about an anatomic reduction in the majority of instances. In case reduction is not accomplished, then one should resort to open reduction at once, refusing anything short of normal restoration. I wish to emphasize the importance of follow-up. The usual anteroposterior and lateral views should be taken, and roentgenograms should be made at monthly intervals for the first six months, at intervals of two months for the second six months, every three months for the third six months and then at intervals of six months for a minimum period of three years. It is only in this manner that early nonunion can be anticipated or diagnosed and that aseptic necrosis and avascular necrosis can be discovered and adequate treatment instituted.

DR. ROBERT H. KENNEDY, New York: The paper by Drs. Cleveland, Bosworth and Thompson is an important presentation. Comparison is made between a large group of patients treated by internal fixation and one treated by closed methods. Our experience at the Beekman-Downtown Hospital has not been exactly similar. In our group of 34 patients in the past six years, the average age was 63, as compared with 75 in Dr. Bosworth's report. Whatever variance we might find in complications and results might readily be due to a difference of twelve years. Only 20 per cent of our group were over 70, quite at variance with the group just reported. Our major treatment has been by Russell traction, and only 5 of this group had internal fixation. The mortality among patients treated in traction was 7 per cent, differing greatly from their mortality of 30 per cent when treated by traction, or 12 per cent by internal fixation. There was no mortality in our 5 patients treated by internal fixation. It seems that it makes a great difference what type of person one handles. The duration of traction in our cases averaged sixty-seven days. We no longer depend on adhesive plaster on the leg but use a Kirschner wire through the os calcis. As regards decubitus, which Dr. Bosworth and his group stated was almost the rule with traction treatment, this occurred in only 10 per cent of our patients. The frequency of stiff knees was low. We expect a good functional result following the use of Russell traction for as long a period as nine to ten weeks. There were 3 patients, 10 per cent, who experienced serious complications. One had a pulmonary infarct, and 2 had pneumonia. The hospital stay for traction cases was ninety-three days, compared with ninety-eight, and for internal fixation fifty-four, compared with fifty-seven. It is important to gain experience in internal fixation and have ready the proper setup for whatever nail one uses so that every hospital may do internal fixation when indicated. On account of low mortality, low morbidity, and lack of complications, we are in favor of continuing Russell traction in the majority of instances. In going over the paper, I did not note that it stated how soon these patients in internal fixation were allowed to be ambulatory. One must remember that in many instances, when one speaks of operating so that the persons may become ambulatory, one finds, on looking up the records, that one did not get them up early. Every one of these fractures can be expected to heal. There is little reason to go on record in favor of operating to avoid complications unless the patients are actually gotten out of bed.

DR. ALEXANDER P. AITKEN, Boston: I agree with Dr. Badgley that the terms "aseptic" and "avascular" necrosis are loosely applied. The correct term for death of the head following fracture or dislocation should be avascular necrosis. Inasmuch as death of the head cannot be determined for several months following fracture, all such fractures should be considered with suspicion. The high incidence of avascular necrosis is an argument for abstinence from weight bearing until one is reasonably sure that this condition is not going to develop. Even when there is avoidance of weight bearing, however, if the initial damage has been sufficiently severe aseptic necrosis will eventually develop. Phemister has proved that the underlying cause is rupture or thrombosis of the capsular vessels. One must therefore be most careful to prevent further damage. Consequently, all manipulation must be carefully done. I do not believe, however, that careful manipulation of a hip will do much to jeopardize the circulation of

the head. I do not believe that any more harm is done by manual reduction than by the manipulation necessary in the application of skeletal traction. Dr. Badgley stated that union occurred in 90 per cent of his cases if traction was applied immediately. I do not recall, however, that he stated the incidence of avascular necrosis that occurred in this series. More careful study must be done before it is known whether or not the method of reduction plays a part in the development of aseptic necrosis. I would agree with Dr. Badgley that open reduction should be avoided whenever possible. Damage to the capsular vessels by surgical treatment must occur. However, many men are routinely operating on fresh hips, and it would be interesting to compare an incidence of aseptic necrosis in fractures treated by the open method with those treated by the pinning method. If, in two or three months or, as is more common, in six to eight months, it becomes obvious that aseptic necrosis has developed, Dr. Badgley has recommended weight bearing and protection until regeneration has occurred. If one could be sure that such regeneration would occur, such a procedure would be most advisable. The restoration of circulation with resorption of the dead bone and replacement of the head is a slow process. The chances of obtaining a normally shaped head with normal cartilage and without arthritic changes are rather small. Rather than submit our patients to such prolonged immobilization, in the presence of aseptic necrosis, my associates and I believe it wise to remove the head and perform a fusion of the hip or some type of reconstruction, despite the fact that the end results of these procedures leave much to be desired.

DR. WARREN WHITE, Greenville, S. C.: We have a rather definite responsibility in this section as regards the treatment of fractures. If you will go through some of the old programs of the American Medical Association you will notice the disappearance of papers on fractures in the Section on General and Abdominal Surgery. The responsibility, therefore, rests largely on this section, which, as I see, is being attended by so many general surgeons that we must get down to fundamentals and not be too technical in our discussions. I have a problem in South Carolina which is a considerable one. In the state there are only eight orthopedic surgeons. All eight of us cannot nail all the hips, and the general surgeons are still rather reluctant about doing hip nailing as a routine. At the risk of interjecting something which may be irrelevant to our subject this morning, I am going to ask whether one of our panel here will not discuss the more conservative method, surgically speaking, of taking care of these fractures of the neck of the femur if the surgeon is in a place where satisfactory hospital facilities are not available for hip fixation. What is the next best thing? I get many telephone calls from persons throughout the country trying to get into the hospital for fractures of the neck of the femur. We just do not have the hospital beds. I want to give these surgeons something to do that is better than Buck's extension.

DR. JOSE VALLS, Buenos Aires, Argentina: I agree, in a general way, with what the speakers said. I have used nailing in about 200 cases myself. I use traction for the first few days after admission of the patient, and I do the nailing during the first week, if it is possible. I used to handle the patients not with manipulation, but with slight traction and some internal rotation, and I succeeded in getting good reduction practically in all cases. I try to reduce the fracture not exactly, but to put the head in valgus position. That seems to me -- and I have been doing this during the last few years -- to help greatly in the union. After the nailing, I put a short plaster cast on for three months. If I need to move the patient, I use a special device to prevent weight bearing. I take off the cast after three months, and the patient walks with crutches, or some kind of braces, at least for six to nine months. I have been using a guide of my own in nailing for thirteen years. I think it is the best, but I believe that the proper position can be maintained with wires, with a screw, with bone graft or with a nail. The most important complication nowadays is aseptic necrosis. This is the field in which surgeons can do something in the next few years. In this field, Dr. Bado of Montevideo, Uruguay, claims that the bone graft, instead of nails, or screws, is better, and in his cases he has not seen so many with aseptic necrosis. In the intertrochanteric fractures, I have for many years used wire traction with the patient in bed, but now I have changed. I use a Neufeld nail, and I have about 20 cases in which this treatment was used. I am satisfied with the results because the patient can leave the bed in one week or more and go home in fifteen to twenty days. That cuts down the cost of the treatment.

DR. GEORGE W. VAN GORDER, Boston: To answer Dr. White, one realizes that there are a number of patients who are not close enough to hospitals to have the care that is necessary in hip nailing. The next best method of treating fractures of the neck of the femur, if one cannot nail them, is to use the Whitman abduction plaster of paris method. My third choice would be Russell traction. Figures on mortality mean little or nothing, unless the length of time that is involved and the complete data regarding them are known. Do I believe in leaving alone impacted types of fractures in group 1? For many years, we never nailed an impacted fracture, but we allowed it to go on to union, expecting it to unite and finding that it nearly always did unite. Later we became too certain of our judgment and on a rare occasion were deceived by the roentgenograms, only to find that the apparent impaction was not real and did not hold. In view of the uncertainties of roentgen interpretation in these cases, some of my colleagues and I now prefer to nail impacted fractures of the femoral neck as well as the unimpacted ones. I would treat the extremely high subcapital fracture in an elderly woman by internal fixation with a Smith-Peterson nail and possibly would use a bone graft as well, depending on the obliquity of the fracture line. I am asked why, in an oblique or vertical fracture of the femoral neck, the third type which is so hard to unite, I do not do an osteotomy as a method of choice. There, again, it is a matter of personal opinion. It was with extreme interest that I heard Dr. Boyd speak this morning about his results with Pauwels' group 3 type of fracture. Apparently in Boyd's experience, these patients did as well under similar treatment as those of a supposedly more favorable type.

DR. HAROLD B. BOYD, Memphis, Tenn.: If we are to learn more about aseptic necrosis, adequate follow-up roentgen studies must be made on a large number of patients. In addition to the usual postoperative roentgenograms, we endeavor to secure anteroposterior and lateral roentgenograms of the hip two and six weeks after the operation; then roentgenograms are taken every three months for a year and each six months the second year. If possible, roentgenograms should then be taken of the hip at least once a year as long as the patient lives. In regard to

Pauwels' type 3 fractures, it has been the general belief, including ours, that the prognosis is poorer in these fractures than in type 2 fractures. Our statistics do not substantiate this belief. Apparently, the internal fixation eliminates the shearing force: if so, the prognosis should be no better in type 2 than in type 3 fractures. From the data presented, we do not believe that additional operative procedures such as osteotomies and bone grafts should be done on type 3 fractures just because they are type 3, unless the surgeon would advocate the extra operative work under the same circumstances if the fracture were type 2.

DR. J.A. DICKSON, Cleveland: I am asked, "Is there any tendency to fracture of the shaft of the femur when an especially large chisel is being used?" The special chisel is used only as a marker. The osteotomy is completed with a sharp osteotome. The question is raised: "Can you always rotate the head with the nail blade in all nonunions? If not, what then?" Here again is an essential point of technic. One must not rotate the head. One is dealing with a small segment of extremely soft bone that is sitting up on the end of the nail. The important factor is to fix this segment in one position, hold it firmly and bring the leg into abduction with a little traction. We have not found abduction deformity of the hip a postoperative complication in our osteotomy. None of the patients have had any difficulty from this angle. They walk well; the leg comes into excellent position for function, and they get good range of motion. I am asked to discuss the type of anesthesia in reduction and internal fixation of neck fractures and whether gas and oxygen with intravenously given "pentothal sodium" is the anesthesia of choice. In all these cases, particularly as the operations have to be done under roentgen control, there are certain time-consuming factors that cannot be avoided. This necessitates real consideration of the anesthesia used. We carry the patient very lightly on "pentothal sodium" and add a little gas and oxygen as indicated. With respect to the advisability of an osteotomy in fresh fractures of the neck of the femur in a good risk patient, I concur with some of the other speakers that there is a definite place for osteotomy and rotation in properly selected fresh fractures of the neck of the femur. This, however, must be planned in such a way as to maintain the proper equalization of leg length.

DR. PHILIP D. WILSON, New York: I agree with Dr. Van Gorder on procedures 1 and 2. The procedure of choice is the nailing. The second choice, if one is unable to nail the hip, is certainly the Whitman abduction plaster cast, but to put on an abduction cast and have it strong enough to hold up is a considerable procedure, a technical procedure, and I doubt, as he does, that the surgeon who is not able to nail the hip would be able to use the substitute procedure, the Whitman abduction cast. The one thing that one should not use in these cases is traction. Every case of the femoral neck that I have ever seen treated by traction has resulted in nonunion. The one thing that is most likely to bring about nonunion is the use of traction. I would suggest as the third procedure a method that is really simple, namely, the use of the Willkie plaster cast. This consists in applying long leg plaster casts on both sides from the toes to the groin. When these two plaster casts have set the legs are rotated inward, and then the two casts are joined by cross bars tying the feet and the knees together, so that the hips are held permanently in this position of abduction. This apparatus has the advantage of allowing the patient to sit up, and I believe that there would be a fair chance of union. I interject this method as a personal opinion of what I believe is the next best procedure.

DR. EDWIN W. RYERSON, Chicago: This has been a discouraging morning. No one has proposed a method that is universally successful in the treatment of fractures of the upper end of the femur. They have had all kinds of disappointments, and it is true that osteotomy, such as the McMurray osteotomy and the one described by Dr. Dickson, would seem reasonable in fresh fractures, because if the Dickson or the McMurray osteotomy will cure an old ununited fracture at the neck of the femur, why will it not just as readily and safely cure a fresh fracture? That is something that we should think of. I have seen a number of cases in which the McMurray osteotomy has been done with a dead head and a nonunion, and I have seen a union occur, and the head become revivified. It is worth thinking about. Why does Dr. Badgley try to get us excited about aseptic and avascular necrosis? Avascular necrosis is certainly aseptic, and aseptic necrosis is certainly avascular; so why not call it aseptic? That is what I am going to do. Many of the nailed hips would recover without difficulty and without any complications if a perfectly accurate reduction were done at the time of the nailing. If you will look at many roentgenograms of nailed hips, as I have done in these many years, you will see that a large proportion of them were not accurately reduced. Some of them went on to union; some of them had good results, but it is difficult to nail a hip accurately unless one can get excellent lateral, as well as excellent anteroposterior, roentgenograms during the course of operation.

DR. RICHARD H. FREYBERG, New York: The outcome does not depend only on what is done for the fracture; whether we be surgeons, internists or general practitioners, we must consider the patient as a whole, as well as the treatment of the fracture. Dr. Van Gorder discussed the quandary regarding statistics of mortality. The major causes of mortality have to do with the condition of the patient outside the fracture; the proper treatment of associated abnormalities and the complications after the trauma or after operation are extremely important in governing the mortality rate. I do not have enough statistics in the cases that we reviewed to answer the question, "Does diabetes add to the possibility of nonunion or necrosis of the neck of the femur?" Only 6 patients in our series had "diabetes." Two of these died of causes other than diabetes. Healing may be a bit slow in patients whose diabetes is not properly controlled. The question was asked, "What is the importance of amino acids in the fractured hip in an aged person?" The major concern is maintenance of good nutrition to prevent inanition, which may develop, especially in the more elderly persons and those with arteriosclerosis. The best thing is food by mouth, properly selected, with generous protein content. There can be additions of good protein hydrolysis, or more pure proteins added to milk and other natural foods. Intravenous protein mixtures should be used only in those severely ill patients who are not able to take or retain food. It is important that amino acids be given to sustain them until they are able to maintain good nutrition by ingestion. Wound healing, of course, is a problem similar to that seen in any patient postoperatively. I

do not understand one question, which is apparently miswritten; it has to do with sedative and hypnotics When I mentioned sedatives, I meant non-narcotic drugs, such as barbiturates, or bromides used to relieve the anxiety of the patient, not to produce sleep Hypnotics should be used to help produce sleep at night. Narcotics should be used chiefly, if not only, to allay pain Endocrine therapy for osteoporosis is a problem too large to discuss in any detail. To correct osteoporosis, it is necessary to provide for proper regeneration of osteoid tissue. That is a problem of protein metabolism. The best way to hasten and improve production of osteoid tissue is to cause great retention of protein by the use of steroid hormones, either androgens o estrogens.

DR. D. M. BOSWORTH, New York With an intertrochanteric fracture and no displacement, we would prefer nailing, since thereafter mobilization of the patient is provided I am asked whether in intertrochanteric fractures I feel that there would be fewer dead heads in patients treated by traction rather than by operation. We have seen one dead head in a patient not treated by traction, but by a plaster of paris cast, in 1932, with the dead head occurring three years thereafter. There were no dead heads in operative cases. Our patients have been extremely old. They come from the old age homes connected with St. Luke's Hospital, so that our list is unusual as to age. The average age is 75 years, twelve years above those of patients with intracapsular fractures. Skin pressure lesions have occurred in our conservatively treated hips because of the age of the patients and their feeble condition. If a patient is left in bed for weeks with any kind of treatment, partially impobilized, even with traction, sooner or later such lesions are going to be found. The pressure marks which we call necrosis of the buttocks are anything from scuffing to actual loss of tissues. High protein intake should be stressed, and a high protein level maintained; however, these patients can be provided with food, but they will not eat unless the nurse insists. Traction for eight to ten weeks is not sufficient for union. It takes up to seven months in some cases, and often up to five months to get a trochanteric fracture absolutely solid. Patients with nailed fractures become ambulatory on crutches in two to three weeks with a brace provided and with light weight bearing.

DR. CARL E. BADGLEY, Ann Arbor, Mich.: I am speaking of a fracture which is healed and looks as though it is doing well The patient goes along comfortably, and then symptoms develop and we see definite roentgen changes which help us make a clinical diagnosis, which differentiates revascularization of the head, to a certain point. Then, with a break through the upper part of the head, and collapse of that part of the head, an absolutely hypothetic picture is produced which I would like to term "aseptic necrosis." That is entirely different from the pictures seen when there is no collapse but there are changes in density associated with loss of joint space and destruction of cartilage, which is similarly the result of avascularity. That we should like to call degenerative arthritis. The term "dead head" I should like to employ in those cases of nonunion. The term "viable head" is the other term, which I should like to use. In early aseptic necrosis which produces symptoms, we would advocate as the best method of treatment that the patient make up his mind whether he wishes to take a gamble or not. If he wishes to take a gamble, by the production of an arthroplasty we still might have a functioning hip Our results in arthroplasty of the hip with aseptic necrosis were surprisingly good. We had 8 cases. In 5 of these results were excellent; in 1 results were fair, and in 2 there was no improvement. Is the disabling arthritis that occurs in 30 per cent of the cases of nailing due in any degree to the trauma of introduction and impaction of the nail? I do not think that the force of the nail produces the arthritis. I think that it is a result of avascular necrosis. What advantage is there of removing the nail after union is complete? From my point of view, we put the nail in purposely so that we can remove it.

PENICILLIN AND FEVER THERAPY IN EARLY SYPHILIS

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After the introduction of penicillin as an effective agent in the treatment of early syphilis [1] other therapeutic measures were given in combination with it to determine whether the effectiveness could be increased by these procedures It was shown experimentally that there was a therapeutic synergism between penicillin and oxophenarsine hydrochloride [2] in vitro, as well as between penicillin and fever therapy.[3] A preliminary report [4] had indicated that the use of penicillin and physically induced fever might be worthy of study in man

There are two main problems in the study of such a combination. First, will the addition of fever result in an appreciable increase of favorable results over the therapeutic effectiveness of the same amount and kind of penicillin administered for the same period without fever? Secondly, can the duration of treatment with penicillin be shortened without the loss of efficiency by the addition of fever?

In an attempt to clarify these questions an investigation was planned utilizing two regimens for the administration of physically induced fever (Kettering 'hypertherm") and the sodium salt of penicillin.

In both schedules the total amount of penicillin was the same (1,200,000 units), whether given over seven and one-half days or during a period of approximately

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From the Chicago Intensive Treatment Center, Venereal Disease Control Program, Chicago Board of Health, in cooperation with the United States Public Health Service.
The work described in this paper was done under a contract, recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and the Chicago Intensive Treatment Center.

1. Mahoney, J. F.; Arnold, R. C., and Harris, A. Penicillin Treatment of Early Syphilis: Preliminary Report, Am. J. Pub Health **33**: 1387, 1943.

2. Eagle, H.; Magnuson, H. J., and Fleischman, R. The Synergistic Action of Mapharsen and Penicillin in the Treatment of Experimental Syphilis, J. Ven. Dis. Inform. **27**: 3, 1946.

3. Eagle, H., and Musselman, A. D.: Spirochetocidal Action of Penicillin in Vitro and Its Temperature Coefficient, J. Exper. Med. **80**: 493, 1944. Massell, B. F.; White, P. D., and Jones, T. D.: Effect of Elevated Temperature in the Action of Penicillin in Viridans Streptococci: Isolated from Patients with Subacute Bacterial Endocarditis, Am. J. Med. **1**: 28, 1946.

4. Craig, R. M.; Schwemlein, G. X., and Kendell, H. W.: Penicillin Combined with Fever Therapy, J. Lab. & Clin. Med. **30**: 1016, 1945.

thirty hours. This has afforded the opportunity to compare results in the first instance with those in a group receiving the same type of penicillin alone in seven and one-half days. We have not treated early syphilis with penicillin alone in thirty hours, but the results of the second schedule may be compared to the first and to those obtained with the same amount of penicillin given by the interrupted intramuscular method over three and three-quarter days.[5]

SCHEDULE A

One hundred and twenty patients exhibiting dark field positive lesions of primary or secondary syphilis were prepared for treatment.[6] One hundred and nine patients were completely treated by the following schedule within the period from Jan. 4, through July 29, 1945. Each patient received 20,000 units of sodium penicillin intramuscularly every three hours for sixty doses, over seven and one-half days (1,200,000 units total) plus three 3 hour sessions of artificial fever at 106 F. (rectal) level on alternate days, beginning twenty-three hours after penicillin was started. No further treatment was given unless clinical or serologic failure or pregnancy occurred.

Observation of these patients over a maximum period of twenty-three months and a minimum of sixteen months is presented.

The distribution of patients according to age, sex and race is given in table 1. The age of the patients ranged from 15 to 40 years; 21.1 per cent were under 20; 43.1 per cent were 20 to 24 years of age; and

TABLE 1.—*Patients Treated According to Schedule A: Number and Percentage of Patients Grouped by Race, Sex and Age*

Race and Sex	Age in Years: Number: Total	Under 20	20 to 24	Over 24	Percentage: Total	Under 20	20 to 24	Over 24
Total...	109	23	47	39	100.0	100.0	100.0	100.0
Male...	46	11	13	22	42.2	47.8	27.7	56.4
Female...	63	12	34	17	57.8	52.2	72.3	43.6
White...	19	1	11	7	17.4	4.3	23.4	17.9
Male...	8	..	4	4	7.3	...	8.5	10.3
Female...	11	1	7	3	10.1	4.3	14.9	7.6
Negro...	90	22	36	32	82.6	95.7	76.6	82.1
Male...	38	11	9	18	34.9	47.8	19.2	46.2
Female...	52	11	27	14	47.7	47.8	57.4	35.9

35.8 per cent were 25 or over. There were 9 (8.3 per cent) cases of primary seronegative syphilis; 27 (24.7 per cent) of primary seropositive syphilis (including 2 reinfections); 64 (58.7 per cent) of secondary syphilis (including 1 reinfection), and 9 (8.3 per cent) cases of relapsing early syphilis.

The results of treatment at designated intervals are summarized in table 2 for the whole group, and demonstrated in chart 1 by stage of disease.

The percentages used for the chart on successes and failures were obtained by assuming that patients lost from observation would have shown the same ratio of results of treatment as those observed. The ratio of the number of patients observed in each period to the number observed in the preceding period was applied to the cumulative

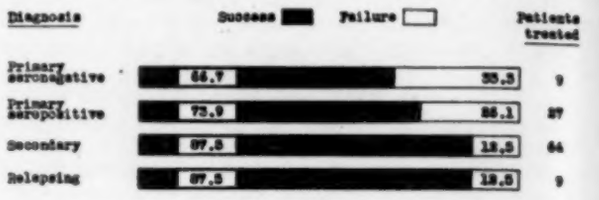

Chart 1.—Percentage of successes and failures by diagnosis at end of first year's observation of 109 patients treated according to schedule A.

failure figure. Patients with positive significant serologic titers[7] after twelve months' observation have been grouped with failures. Those who were seronegative or who maintained nonsignificant titers were, for the present, considered successes.

TABLE 2.—*Patients Treated According to Schedule A: Results and Number of Days from Beginning of Therapy*

Number of Days from Beginning Date of Therapy	Number of Patients: Total Observed During Period or Later	Serologic Titer: Negative	Positive	Failures
0- 29	109	12	97	..
30- 59	99	23	76	..
60- 89	94	30	64	..
90-119	92	39	46	7
120-149	85	45	37	3
150-179	81	52	26	3
180-209	73	51	21	1
210-239	68	51	16	1
240-269	63	49	14	..
270-299	63	53	9	1
300-329	58	51	7	..
330-359	53	51	2	..
360-149	50	50	..	..

All lesions healed immediately after treatment. There was, in general, no pronounced difference in the rate of healing from that observed with similar amounts of penicillin alone.

Sixty-eight of the 100 seropositive patients achieved seronegativity after treatment. Four (5.9 per cent) of these subsequently relapsed. One patient was retreated because of pregnancy.

A lumbar puncture was performed on all but 2 of the patients prior to treatment. There were 29 examples of group 1 cerebrospinal fluid and 1 example of group 3 according to the criteria of Moore and Mohr.[8] Of this group of 30 patients, 4 had repeat examinations in the six month or one year interval. These revealed two normal spinal fluids and two of the group 1 type. Among the 16 patients with treatment failures 2 had abnormal fluids of the group 1 type before treatment. All the 14 patients with normal pretreatment spinal fluids whose treatment failed were reexamined at the time of failure and showed no evidence of neurorecurrence.

Treatment was known to have failed in 16 of the total patients treated. The failures consisted of 2 examples of relapsing primary syphilis; 5 of primary syphilis progressing to secondary syphilis; 5 of relapsing secondary syphilis and 4 serologic relapses. Three patients were considered to have probable reinfections.

Reactions consisted of local and systemic Herxheimer reactions which were apparent before fever was

5. Bauer, T. J.; Bundesen, H. N.; Craig, R. M.; Schwemlein, G. X., and Barton, R. L.: The Treatment of Early Syphilis with 600,000 Units of Penicillin in Seven and One-Half Days, Am. J. Syph., Gonor. & Ven. Dis. **31**: 45, 1947.

6. Bundesen, H. N.; Bauer, T. J., and Kendell, H. W.: The Intensive Treatment of Gonorrhea and Syphilis, J. A. M. A. **123**: 816 (Nov. 27) 1943.

7. Four Kahn units or more.

8. Moore, J. E., and Mohr, C. F.: Penicillin in the Treatment of Neurosyphilis, Am. J. Syph., Gonor. & Ven. Dis. **30**: 405, 1946.

artificially induced. Eleven of the 120 patients did not complete the prescribed amount of fever and are not included in this report; 8 of these because of lack of cooperation, 2 because of cardiovascular fatigue, and 1 because of uncontrollable fever.[9] All but 1 continued to receive the full amount of penicillin. No serious reactions were noted during or after treatment in any of the 120 patients.

SCHEDULE B

One hundred and ninety patients, exhibiting dark field positive lesions of primary or secondary syphilis, were considered eligible for treatment. One hundred and eighty-eight completed treatment by the following schedule within the period from Dec. 27, 1944 through July 30, 1945. Each patient received 50,000 units of sodium penicillin intramuscularly every two hours for twelve doses beginning at 10 a. m. the day prior to fever (total 600,000 units). Following the twelfth dose, the patient was placed in the "hypertherm" and given six hours of maintained fever at 106 F. (R) level, and at each hour of elevated temperature received 100,000 units of penicillin intramuscularly (600,000 units total). This provided a total dose of 1,200,000 units of penicillin and six hours of fever in approximately thirty hours.

No further treatment was given unless clinical or serologic relapse occurred or pregnancy intervened.

Observation of these patients over a maximum period of twenty-three months and a minimum of sixteen months is presented.

The distribution of patients according to age, sex and race is given in table 3. The age of the patients ranged from 15 to 50 years; 22.9 per cent were under 20 years of age; 44.1 per cent from 20 to 24 years,

TABLE 3.—*Patients Treated According to Schedule B: Number and Percentage of Patients Grouped by Race, Sex and Age*

Race and Sex	Age in Years: Number Total	Number Under 20	Number 20 to 24	Number Over 24	Percentage Total	Percentage Under 20	Percentage 20 to 24	Percentage Over 24
Total.....	188	43	83	62	100.0	100.0	100.0	100.0
Male.....	81	9	31	41	43.1	20.9	37.3	66.1
Female...	107	34	52	21	56.9	79.1	62.7	33.9
White.....	35	7	12	16	18.6	16.3	14.5	25.8
Male.....	15	1	4	10	8.0	2.3	4.8	16.1
Female...	20	6	8	6	10.6	14.0	9.7	9.7
Negro.....	153	36	71	46	81.4	83.7	85.5	74.2
Male.....	66	8	27*	31	35.1	18.6	32.5	50.0
Female...	87	28	44	15	46.3	65.1	53.0	24.2

* Including 1 Japanese.

and 33 per cent over 24. There were 18 (9.6 per cent) cases of primary seronegative syphilis; 35 (18.6 per cent) of primary seropositive syphilis (including 1 reinfection); 128 (68.1 per cent) of secondary syphilis (including 3 reinfections), and 7 (3.7 per cent) cases of relapsing early syphilis.

The results of treatment at designated intervals are summarized in table 4 for the group as a whole, and demonstrated in chart 2 by stage of disease. The statistical device used was identical to the one described earlier in this paper.

All lesions healed immediately after treatment; there was a tendency to require a similar amount of time as those in schedule A, which was a more prolonged form of treatment. The healing of the lesions was comparable, however, if one compared the two groups from the date of initiation of treatment.

TABLE 4.—*Patients Treated According to Schedule B: Results and Number of Days from Beginning of Therapy*

Number of Days from Beginning Date of Therapy	Number of Patients: Total Observed During Period or Later	Serologic Titer: Negative	Serologic Titer: Positive	Failures
0- 29	188	9	179	..
30- 59	174	25	149	..
60- 89	165	42	113	10
90-119	147	51	89	7
120-149	137	57	71	9
150-179	123	61	57	5
180-209	115	64	49	2
210-239	110	63	45	2
240-269	105	66	35	4
270-299	97	66	29	2
300-329	90	61	25	4
330-359	83	60	20	3
360-449	74	62	8	4

Eighty-three (48.8 per cent) of the 170 seropositive patients achieved seronegativity. Nine (10.8 per cent) of the 83 subsequently relapsed. Three patients were retreated because of pregnancy.

Treatment in 52 of the total 188 patients was known to be a failure: There were 4 examples of relapsing primary syphilis; 5 of primary syphilis progressing to secondary syphilis; 18 of relapsing secondary syphilis; 24 of serologic relapses, and 1 neurorecurrence. Four possible reinfections were considered failures.

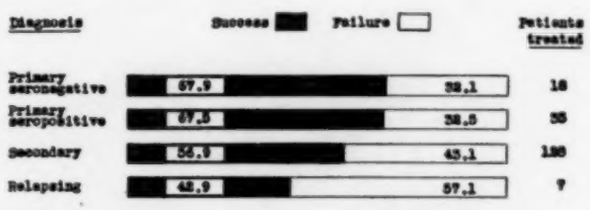

Chart 2.—Percentage of successes and failures by diagnosis at end of first year's observation of 188 patients treated according to schedule B

A lumbar puncture was performed in all but 6 of the patients prior to treatment. There were 32 abnormal spinal fluids of group 1 and 2 of group 3. Of these 34 patients, 16 had repeat examinations from six months to one year later. Seven revealed normal fluids and 9 abnormal; 7, group 1, 1 group 2 and 1 group 3.

Among the 52 whose treatment was a failure, 11 had abnormal spinal fluids before treatment. There were 9 patients with group 1 fluids and 2 with group 3 fluids. Of the 11 patients, 5 showed normal post-treatment fluids and 3 group 1 and one each group 2 and group 3 fluids; 1 patient was not reexamined. Of the 41 patients with normal pretreatment spinal fluids who later relapsed, 30 were normal when reexamined at the time of failure and 2 had group 1 fluids. Nine patients were not reexamined.

Reactions during treatment as in schedule A consisted of local and systemic Herxheimer reactions which were apparent before fever was induced. Eleven patients did not receive the prescribed amount of treatment and are not included in the evaluation, 7 because of lack of cooperation; 2 had hyperpyrexial psychosis but recovered quickly with lowering of the fever, and 2 missed one dose of penicillin, omitted through error. There were no serious reactions in the entire group.

9. Schwemlein, G. X.: The Effect of Elevated Body Temperature on the Cardiovascular System and the Electrocardiogram with Special Emphasis on the Chest Leads, Arch. Phys. Med. 28: 165, 1947.

COMMENT

Comparison of the results of treatment in schedule A. —i. e., 1,200,000 units of penicillin with three sessions of artificial fever with another group who received penicillin alone[10] in the same time-dose relationship makes apparent that the group receiving the additional fever has a lower failure rate. When broken down by diagnosis it is obvious that the groups may not be large enough for tests of statistical significance. However, in the group receiving penicillin alone there are 176 untreated cases of secondary syphilis with a cumulative failure rate of 35.7 per cent, while in schedule A the cumulative failure rate is 12.5 per cent in 64 cases of untreated secondary syphilis. The cumulative failure rate taken regardless of diagnosis is 29.6 per cent in 324 patients receiving penicillin alone and 17.9 per cent in the 109 patients receiving the additional therapeutic fever (chart 3).

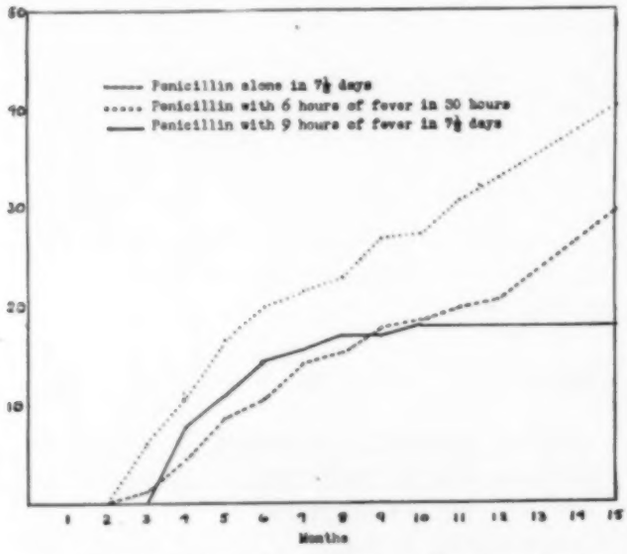
Penicillin alone in 7½ days
Penicillin with 6 hours of fever in 30 hours
Penicillin with 9 hours of fever in 7½ days
Months

Chart 3.—Cumulative failures for patients treated with 1,200,000 units of penicillin.

Schedule B is not as effective as schedule A, as evidenced by the cumulative failure rate of 43.1 per cent among 128 patients with untreated secondary syphilis and 40.1 per cent in the group of 188 patients taken regardless of diagnosis.

In chart 4[11] are shown the cumulative failure rates of the groups receiving fever therapy compared to patients receiving 300,000 units of penicillin in seven and one-half days plus oxophenarsine hydrochloride (0.04 Gm.) daily (51 per cent)[12]: patients receiving 600,000 units in seven and one-half days (40.5 per cent)[9]; 1,200,000 units in three and three-quarter days (25.2 per cent)[13]; 1,200,000 units in seven and one-half days (29.6 per cent)[10]; 10,000,000 units in twenty-four hours (67.8 per cent), and 25,000,000 units in twenty-four hours (35.2 per cent).[14] It is apparent that the group receiving 1,200,000 units of penicillin over seven and one-half days and three 3 hour sessions of fever at 106 F. (rectal) has the lowest cumulative failure rate.

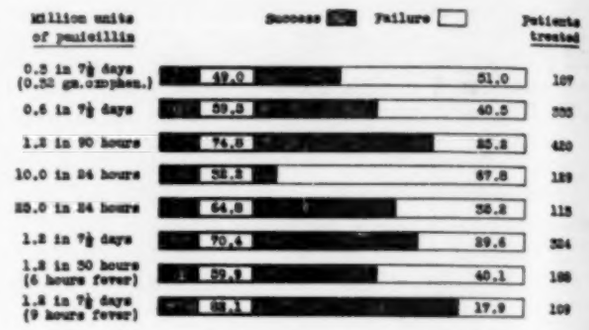
Million units of penicillin
Success
Failure
Patients treated
0.3 in 7½ days (0.32 gm. oxophen.) 49.0 51.0 107
0.6 in 7½ days 59.5 40.5 203
1.2 in 90 hours 76.8 23.2 420
10.0 in 24 hours 32.2 67.8 189
25.0 in 24 hours 64.8 35.2 113
1.2 in 7½ days 70.4 29.6 324
1.2 in 30 hours (6 hours fever) 59.9 40.1 188
1.2 in 7½ days (9 hours fever) 82.1 17.9 109

Chart 4.—Percentage of successes and failures at end of first year's observation.

The tendency toward neurorecurrence was not apparent. In the majority of patients examined there was improvement in the abnormal cerebrospinal fluid formulas.

The sodium penicillin used on the fever-penicillin schedules was the same as that used in the group receiving penicillin alone (1,200,000 units in seven and one-half days). The time of administration was, in general the same; i. e., the first six months of the year 1945.

That the fever-penicillin schedules were technically more difficult to administer is not disputed. Furthermore, it was impossible to complete the fever portion of the treatment in some patients who, because of inadequate intelligence, refused to cooperate.

SUMMARY

One hundred and nine patients with dark field positive lesions of early syphilis were given 1,200,000 units of penicillin over seven and one-half days and three sessions of physically induced fever (schedule A). One hundred and eight-eight patients with dark field positive lesions of early syphilis were given 1,200,000 units of penicillin over a period of approximately thirty hours and a single six hour session of fever (schedule B).

The cumulative failure rate in schedule A was 17.9 per cent as compared with 29.6 per cent in a group receiving the same amount of penicillin alone. Attempts to shorten the fever-penicillin treatment to thirty hours were unsuccessful in that the failure rate was 40.1 per cent.

Penicillin and fever therapy given over seven and one-half days produced the lowest cumulative failure rate among patients treated with penicillin in the studies described.

10. Barton, R. L.; Bauer, T. J., Bundesen, H. N.; Craig, R. M., and Schwemlein, B. X.: The Treatment of Early Syphilis with Penicillin: Report on Three Hundred and Twenty-Four Patients Treated with 1,200,000 Units over One-Half Days, to be published.

11. The results presented in this paper must be interpreted in light of the fact that from June 1943, the date of inception of the study, to the present time, commercial penicillin has been a changing mixture of various substances. The content of "impurities" has gradually decreased as potency, in terms of units per milligrams, has increased. The relative amounts of the several identified penicillin fractions, G, F, X and K, have likewise varied from time to time. Those two changes, and perhaps others, suggest that therapeutic efficacy may not have remained constant and that it may be significantly different today than it was originally. It is not now possible to assess the extent to which these changes may have affected the results here reported.

12. Bundesen, H. N.; Craig, R. M.; Schwemlein, G. X.; Barton, R. L., and Bauer, T. J.: The Rapid Treatment of Early Syphilis with the Combined Use of Penicillin and Mapharsen, Am. J. Syph., Gonor. & Ven. Dis. 30: 75 1946.

13. Craig, R. M.; Schwemlein, G. X., Barton, R. L.; Bauer, T. J., and Bundesen, H. N.: Penicillin in the Treatment of Early Syphilis. Four Hundred and Twenty-Nine Patients Treated with 1,200,000 Units of Penicillin in Ninety Hours, Ann. Int. Med. 27:225. 1947.

14. Peters, E. E., and Barton, R. L.: The Massive Intravenous Penicillin Therapy of Early Syphilis, Am. J. Syph., Gonor. Ven. Dis. 30:475. 1946.

Special Article

This article is the thirteenth of a series to be published by the American Medical Association in cooperation with the American Cancer Society. The series is designed to aid in the early diagnosis of cancer and thereby to gain more effective results in treatment.

CARCINOMA OF THE ESOPHAGUS AND STOMACH

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I. CARCINOMA OF THE ESOPHAGUS

The epochal advances which have been made in the field of thoracic surgery in the past ten years have brought about a new interest in the subject of carcinoma of the esophagus, a disease which until now has been attended by a completely hopeless prognosis. This interest results from the demonstration that in a large number of the cases a resection and intrathoracic esophagogastric anastomosis can be performed. Sufficient experience with the use of this operation has been accumulated to prove that it provides by far the best form of palliation among the patients who will ultimately succumb to the disease, but more important than that is the fact that an appreciable number of patients will survive for three or more years as a result.[1] This operation, therefore, for the first time provides hope that a patient may be cured of this dread disease.

Carcinoma of the esophagus is a common disease. At the Massachusetts General Hospital approximately two thirds as many cases of carcinoma of the esophagus are seen as of carcinoma of the stomach. It has been estimated that there are approximately 40,000 deaths per year in the United States of America because of carcinoma of the stomach. It is reasonable, therefore, to assume that there are about 26,000 to 27,000 deaths per year from carcinoma of the esophagus.

Although they are characteristically of the squamous cell variety, the degree of malignancy of these tumors is of a high order. This is shown by the fact that in over 70 per cent of the patients whose growths are resectable there are already metastases to the regional lymph nodes at the time of operation.[2] Extension of the growth in the wall of the esophagus is often wide, and involvement of the adjacent organs by direct invasion frequently occurs relatively early in the development of the disease. All hope of cure therefore rests on the establishment of an early diagnosis and the prompt resort to surgical extirpation.

DIAGNOSIS

There are three important means of investigation available which when combined should make it possible to establish a positive diagnosis in every case of carcinoma of the esophagus. These are as follows:

1. *Clinical History.*—The onset of the symptoms in carcinoma of the esophagus is almost invariably the same from case to case. The first symptom is dysphagia, often intermittent, depending on the physical properties of the food swallowed. The patient usually chokes first on a large piece of meat. After that experience he is likely to do nothing about it excepting to chew his food more carefully or to avoid eating that which caused the difficulty. In a few weeks, however, he discovers that he is unable to swallow other foods. Bread usually presents the next obstacle. By the time he cannot swallow bread, he finds it necessary to have his meat ground and to eat only soft, nonbulky, solid foods. From then on the transition to the point where he can swallow only liquids is rapid. In the majority of patients the duration of symptoms from the time of onset to the time of first admission to the hospital is six months or less (table 1).

TABLE 1.—*Duration of Symptoms in Carcinoma of the Esophagus and Cardia (First Symptom to Entry to Hospital)*

	Location of Carcinoma			
	Cardia		Midthoracic Esophagus	
	No. of Cases	Per ta.	No. of Cases	Percentage
Less than 3 months	23	22.3	23	36.5
3 to 6 months	37	35.9	16	25.4
6 to 9 months	20	19.4	10	15.9
9 to 12 months	7	6.8	5	7.9
Over 12 months	11	10.7	5	7.9
Not stated	5	4.9	4	6.3
Total	103		63	

In spite of the fact that in carcinoma of the esophagus the duration of symptoms tends to be relatively short, the disease in the majority of cases is already far advanced by the time the patient is seen by the surgeon. This observation on first thought seems difficult to understand because of the fact that the first symptom is the result of obstruction and that the diameter of the

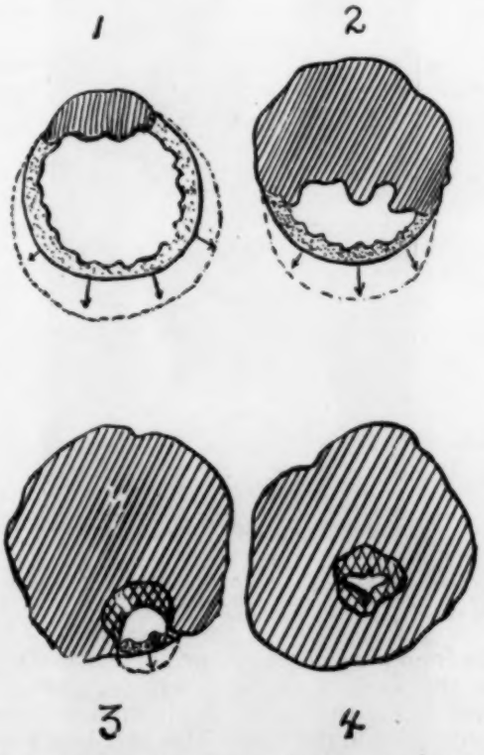

Fig. 1.—Diagram representing cross sections through the esophagus at the level of a carcinoma developing in its wall. 1. Early stage when there are practically no symptoms. 2. Later stage representing the period when large particles may become lodged but with sufficient uninvolved esophagus to permit enough distension for the passage of a fairly liberal soft solid diet. 3. Late stage with almost complete encirclement of the circumference. A narrow strip of uninvolved esophageal wall still allows the passage of liquids. 4. Complete encirclement by tumor with total obstruction. Double-hatched area illustrates the possibility of temporary reestablishment of lumen as a result of necrosis and sloughing of the central portion of the growth.

1. Sweet, R. H.: Carcinoma of the Esophagus and the Cardiac End of the Stomach: Immediate and Late Results of Treatment by Resection and Primary Esophagogastric Anastomosis, J. A. M. A. **135**: 485-490 (Oct. 25) 1947.

2. Sweet, R. H.: Carcinoma of the Midthoracic Esophagus: Its Treatment by Radical Resection and High Intrathoracic Esophagogastric Anastomosis. Ann. Surg. **124**: 653-666, 1946.

esophagus is small. The explanation of the apparent paradox lies in the fact that although the diameter of the esophagus is not large, its wall is very distensible. The result of this is that even though the growth may have involved the circumference of the organ almost completely, there is still enough stretch in the remaining strip of normal esophageal wall to allow the passage of food material through the lumen. It is actually only when the encirclement of the esophagus by the growth is practically complete that the mechanical interference with its function is sufficient to produce a serious degree of obstruction (fig. 1).

Not infrequently after the patient has been almost completely unable to swallow for a period of time, he may experience a sudden release of obstruction so that he can swallow a fairly liberal liquid or soft solid diet again. This results from the necrosis and sloughing of the central portion of the growth so that temporarily at least there is a restoration of continuity along the lumen (fig. 1, no. 4).

Until the end stages of the disease, when complications resulting from distant metastases or local invasion of adjacent organs become manifest, the only other important symptom in carcinoma of the esophagus is pain. It is of two types. The first is the pain which

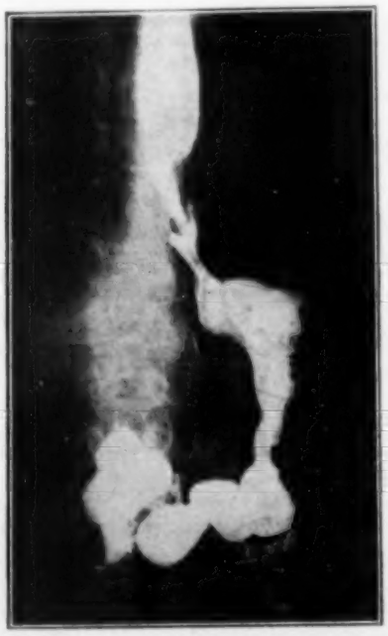

Fig. 2.—Roentgenogram of a carcinoma of the lower fourth of the thoracic portion of the esophagus. Note characteristic encroachment on the diameter of the esophagus with dilatation proximal to the tumor and small stomach below (preoperative roentgenogram).

results from local distension or muscle contraction just above the level of the obstructing growth. This is referred to the substernal region with radiation to the back and often to the neck. This pain is of a segmental nature and may be high or low, depending on the level of the tumor in any given case.

The second type of pain is a steady, boring, aching discomfort felt deep within the chest and in the back. This is usually the result of periesophageal inflammation from a penetrating ulcerating growth. In some cases it signifies the direct invasion of surrounding structures by tumor or sometimes the presence of metastases to the spine. This type of pain is always of sinister prognostic significance and usually denotes inoperability of the growth.

On the basis of clinical history alone every patient who complains of any disturbance associated with deglutition, whether it be with or without local discomfort, should be given the benefit of further investigation by roentgen studies and often by esophagoscopy in order to determine the presence or absence of a carcinoma of the esophagus.

2. Roentgen Examination.—When the disease is well established, there is no difficulty in demonstrating a characteristic irregular filling defect, usually annular in extent, involving the esophagus at whatever level the tumor may be located. The appearance of the shadow seen depends of course on the nature and extent of the tumor. Three different examples, showing both the preoperative and the postoperative roentgen appearances, are presented in figures 2 to 7.

Figure 2 shows the filling defect in the lower portion of the esophagus produced by an advanced epidermoid carcinoma. The relatively long duration of the disease is suggested by the degree of dilatation of the esophagus proximal to the tumor and the small size of the stomach. Figure 3 illustrates the roentgen appearance twelve days after the operation of transthoracic partial esophagectomy and gastrectomy with intrathoracic esophagogastric anastomosis had been performed. In this case it was possible to sever the esophagus low enough so that the anastomosis could be made relatively low in the chest at the level of the inferior pulmonary vein.

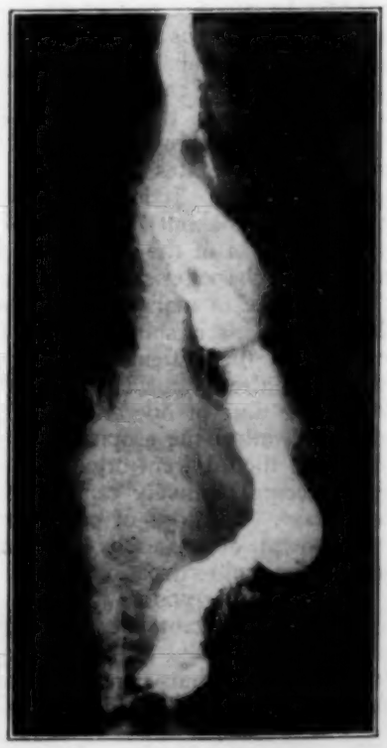

Fig. 3.—Postoperative roentgenogram in case shown in figure 2 after transthoracic partial esophagectomy and gastrectomy. Intrathoracic esophagogastric anastomosis slightly below the level of the left main bronchus which is seen clearly on the film. Actual level is opposite the inferior pulmonary vein.

Figure 4 is a reproduction of the roentgen appearance in a case of carcinoma situated slightly higher in the esophagus than in the case shown in figure 2. The same sort of operation was performed in this case, but the higher level of the growth made it necessary to perform the anastomosis just below the arch of the aorta. This is clearly shown in figure 5, which shows the postoperative roentgen appearance.

A case of carcinoma of the esophagus situated at a much higher level is illustrated by figure 6, which shows the roentgen shadow after the ingestion of barium, with an obvious filling defect situated just behind the aortic arch. At operation in a case of this sort it is necessary to displace the esophagus from behind the aortic arch and to pull the completely mobilized stomach up to the apex of the left pleural cavity for a high supra-aortic esophagogastric anastomosis. The postoperative appearance in such a case is shown in figure 7, which illustrates the location of the anastomosis at the level of the suprasternal notch.

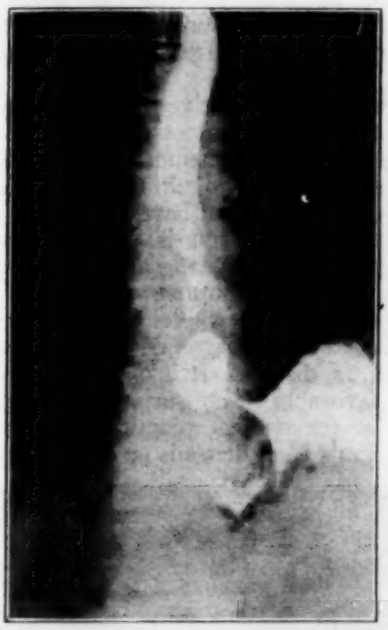

Fig. 4.—Roentgenogram of a carcinoma in the lower portion of the middle half of the esophagus showing a short length of normal esophagus below the growth and a characteristic irregular annular filling defect (preoperative roentgenogram).

From the standpoint of prognosis or even the prediction of resectability the roentgen examination cannot be relied on to be completely accurate. But in general, the larger the filling defect and the greater its longitudinal extent in the esophagus, the more likely is the growth to be inoperable. Every patient, however, should be given the benefit of an exploration if his age and general condition will permit.

If the growth happens to be an early one, on the other hand, its presence may not be detected during the fluoroscopic examination and as a result many weeks of delay ensue. The relative number of cases which are detected bears a direct relation to the skill and interest of the roentgenologist. The physician in charge of such a patient should make it clear that he suspects the presence of an esophageal lesion. If this is not done, the attention of the roentgenologist is likely to be directed toward the stomach and duodenum after a cursory routine observation of the descent of the barium through the esophagus. In general the number of cases in which at least a suggestive diagnosis of carcinoma of the esophagus cannot be made by roentgen examination is exceedingly small. If the findings of the roentenologist are negative or misleading in any case in which the clinical history suggests the presence of an esophageal lesion, direct inspection through an esophagoscope is mandatory.

3. *Esophagoscopic Examination.*—By means of the esophagoscope a positive diagnosis of carcinoma of the esophagus can be established in a large percentage of the cases. The direct visualization provided by this means makes it possible for an experienced observer to recognize the presence of a pathologic area and to obtain tissue for histologic study. It should be remembered, however, that even in the case of a suspicious-looking lesion the examination of material obtained for a biopsy may be negative for carcinoma because of the fact that the grasp of the biopsy forceps was not deep enough. In this way nothing but chronic inflammatory tissue is obtained from the inflammatory area which usually surrounds an infected ulcerated malignant lesion, although a deeper bite of the forceps would reach the tumor tissue. A repetition of the esophagoscopic examination may therefore be necessary. In some such cases it is wiser to proceed with a surgical exploration than to wait until the biopsy becomes positive because of the obvious undesirability of postponing the extirpation of the growth.

TREATMENT

The treatment of carcinoma, in no matter what organ it may arise, should be calculated not only to bring about a cure in the favorable cases, but also to provide the maximum relief of discomfort in the relatively larger group of patients whose disease is beyond the hope of cure. In carcinoma of the esophagus for many years there was little or no hope for cure and a poor prospect for relief of suffering. The failure of roentgen treatment to measure up to the aforementioned ideal of treatment is well known. Few patients treated by this means have been made to live much longer than those who were not treated, although in a small percentage of patients temporary improvement in the ability to swallow has resulted. Bougienage in an attempt to keep a passageway open is disappointing because of the impossibility of applying the method in many cases and the transitory benefit obtained when it has been used.

Fig. 5.—Postoperative roentgenogram in case shown in figure 4 after transthoracic partial esophagectomy and high intrathoracic esophagogastric anastomosis. The anastomosis lies just below the arch of the aorta.

The only hope of cure in the favorable cases and the best prospect of relief among patients who ulti-

mately succumb to the disease is provided by the application of surgery. As a result of vast improvements in this field the operation has been developed to the point where a reasonable outlook for cure and a far better degree of palliation than was ever available before can now be offered to patients who are afflicted with the disease. In this connection mention should be made of the Torek operation, which was first described in 1913.[3] It provides for a limited excision of the tumor-

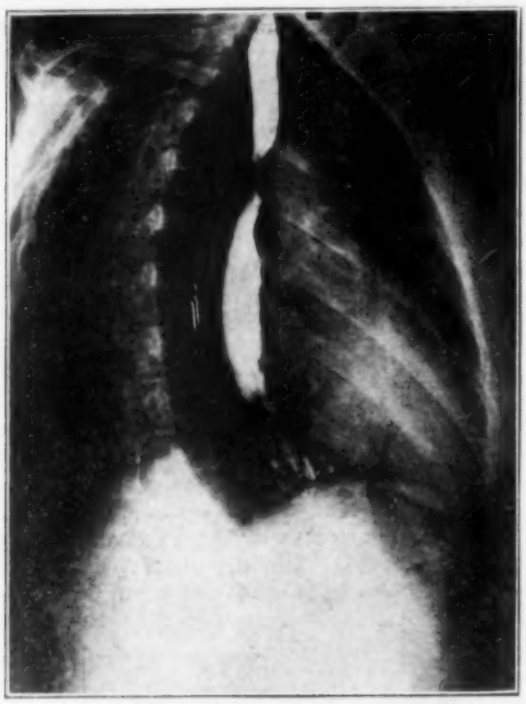

Fig. 6.—Roentgenogram of a carcinoma of the esophagus located beyond the aortic arch (preoperative roentgenogram). Note the short distance between the upper margin of the growth and the level of the clavicle. This type of case requires the performance of an anastomosis at the highest possible level within the chest.

bearing segment of the esophagus but not for the removal of a sufficient number of the regional lymph nodes. As a cancer operation, therefore, it cannot be expected to make possible a large percentage of long survivals among the patients treated (table 2). Furthermore, it is an ineffectual palliative procedure because of the discomforts of the cervical esophagostomy stoma and the annoyance of having to use a gastrostomy opening for feeding. In a few cases an external esophagoplasty can be performed, but only after a many stage plastic procedure which is often not completed before the patient dies of metastases or recurrent disease.[4]

TABLE 2.—*Comparison of the Results of Treatment of Carcinoma of the Esophagus by Several Methods*

	Percentage of Survival 3 or More Years
No treatment	0
Roentgen treatment*	0
Torek operation	8.3
Resection and anastomosis	39.1

* Holmes, G. W., and Schulz, M. D.: Supervoltage Radiation: A Review of the Cases Treated During an Eight Year Period (1937-1944 inclusive), Am. J. Roentgenol. 55: 533-534, 1946.

Because of these inadequacies, the Torek operation has been discarded in favor of the operation of transthoracic resection of the growth with a primary intrathoracic esophagogastric anastomosis. By this means a tumor even as high in the esophagus as the level of the aortic arch can be successfully removed and an immediate restoration of the continuity of the alimentary canal can be established. It has been found that such a resection can be performed in approximately 65 per cent of the patients operated on.[4] The operative mortality of 9.5 per cent (lower end) to 24 per cent (level of aortic arch) is by no means prohibitive in consideration of the hopelessness of the disease. It has been shown likewise that of those who have survived the operation, 39.1 per cent of the patients whose operation was performed three or more years before the date of the follow-up study have lived for three or more years (table 2).

Furthermore, as a palliative procedure the operation of resection and intrathoracic esophagogastric anastomosis is the best method of treatment yet available, because the majority of those who ultimately succumb to the effects of the disease do not have recurrence at the site of anastomosis. The result is that they continue to eat in a normal fashion as long as they may live.

PROGNOSIS

As with carcinoma elsewhere, the ultimate prognosis in carcinoma of the esophagus depends on the duration and extent of the disease. It is obvious, therefore, that to obtain a favorable result surgical excision must be carried out at the earliest practicable moment. The attainment of this ideal depends on the prompt application of the patient to his physician for relief, the alertness of the physician to the possibility of the presence of such a growth, the ability of the roentgenologist to suggest the probable presence of a carcinoma and of the endoscopist to prove it by biopsy, and, finally, the willingness of the surgeon to perform the proper operation.

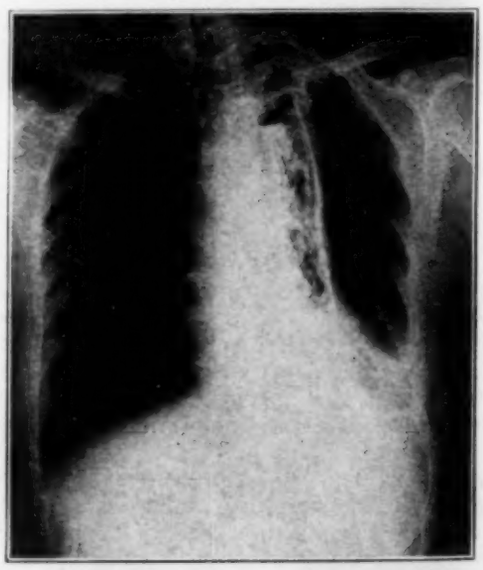

Fig. 7.—Postoperative roentgenogram of the case shown in figure 6 after transthoracic subtotal esophagectomy and high esophagogastric anastomosis. The anastomosis lies above the level of the aortic arch and behind the suprasternal notch.

II. CARCINOMA OF THE STOMACH

Unlike carcinoma of the esophagus, which has only recently been shown to be curable by the prompt application of surgery, carcinoma of the stomach has long been the practical concern of the surgeon. Although the early efforts of the pioneers in the field of abdominal surgery were discouraging because of the high operative mor-

3. Torek, F.: The First Successful Resection of the Thoracic Portion of the Esophagus for Carcinoma, J. A. M. A. **60**: 1533 (May 17) 1913.

4. Sweet, R. H.: Surgical Management of Carcinoma of the Mid-Thoracic Esophagus, New England J. Med. **233**: 1-7, 1945.

tality and the inadequacy of the resection, it has been known for many years that carcinoma of the stomach is curable in a reasonably large number of cases. In recent years, as a result of earlier diagnosis, lower operative mortality and a widening of the scope of the operation, the number of patients who are presumably cured has been increased to an appreciable extent. The latest reports from various clinics have shown that of the patients who are operated on from 20 to 30 per cent will survive five years or more.[5] Pack and McNeer[6] have shown that of the patients in their series who were subjected to resection approximately 35 per cent survived five years or more.

In spite of this relatively encouraging outlook there is a widespread pessimism among physicians at large regarding the results of surgical treatment. This impression can hardly be avoided when one reflects on the over-all prospects of the disease as observed in the population as a whole. Statistical studies from various sources show that of all patients with proved carcinoma of the stomach, not over 5 per cent survive five years or more and then only as a result of the application of surgery. To be influenced by this apparently discouraging result, however, is to place emphasis on the wrong aspect of the problem. The fact that, of all cases of carcinoma of the stomach in which a diagnosis has been made, in only 5 per cent a cure is effected, indicates that a large percentage of the cases are unsuitable for surgery when the patient is first seen or too far advanced for cure even though surgical excision is attempted. There are innumerable statistics to prove this contention. The latest reports show that at least 25 per cent of the cases seen are unsuitable for operation because of the far advanced state of the disease. Furthermore, even in the hands of the most experienced surgeons only 50 per cent of the total number of cases seen are actually suitable for resection. These data are a reflection of the well known fact that in a large percentage of the cases the diagnosis is made late in the course of the disease. The explanation of this unfortunate situation lies partly in the fact that the onset of the disease is often insidious and partly in the neglect of the patient to seek relief at an early date or the failure of the physician to suspect the presence of the disease and to take the necessary steps to establish a diagnosis.

DIAGNOSIS

In the advanced stages of the disease with emaciation, anemia, anorexia, asthenia and perhaps the presence of a palpable tumor in the upper part of the abdomen, the diagnosis of carcinoma of the stomach is usually suspected and readily proved. To establish the diagnosis in such cases, however, is obviously of little importance because of the improbability of cure. Emphasis should be placed on the early detection of the disease. The following discussion will therefore be confined to the problem of discovering such cases at a time when surgery may be expected to provide some prospect of cure.

1. *Clinical History and Physical Findings*.—The first obstacle in the way of establishing an early diagnosis in cases of carcinoma of the stomach lies in the fact that the onset is so often insidious and the early symptoms so vague and obscure. Anorexia and asthenia of slight degree in the absence of any other complaints comprise the first symptoms in approximately 20 per cent of the cases. This type of onset is particularly frequent in growths located in the middle segment of the stomach. Vague dyspeptic symptoms which are spoken of as "discomfort," "distress," "indigestion" or a "bloated or full feeling" after eating are mentioned by about 20 per cent of the patients. Another 25 per cent of the patients complain of definite pain occurring soon after the ingestion of food. In cases in which the tumor happens to lie close to the pylorus such pain may be a prominent early symptom and vomiting may follow after a relatively short lapse of time because of the small diameter of the lumen at that point. If the growth happens to start near the cardia, early involvement of that orifice leads to dysphagia and prompt regurgitation of ingested food.

Bleeding from gastric carcinoma is usually of a chronic nature and is rarely discovered except by the finding of a positive reaction to a test for occult blood in the vomitus or stools. Occasionally, however, massive hematemesis may occur (not over 1 per cent of cases), but it is not often an early sign of the disease.

Objective findings such as evidences of loss of weight, hypochromic anemia and the presence of occult blood in the stools or gastric contents have no specific diagnostic significance. That the difficulty may lie in the stomach is strongly suggested, however, by the additional observation of achlorhydria of the gastric contents. This occurs in approximately 70 per cent of all patients with gastric carcinoma and, when associated with suggestive signs or symptoms, should lead to a strong suspicion of the presence of that disease. That gastric carcinoma can occur in the presence of a normal concentration of hydrochloric acid is also well known. The presence of acid in the gastric contents should therefore never be allowed to militate against the making of a diagnosis of carcinoma of the stomach if other aspects of the case suggest it.

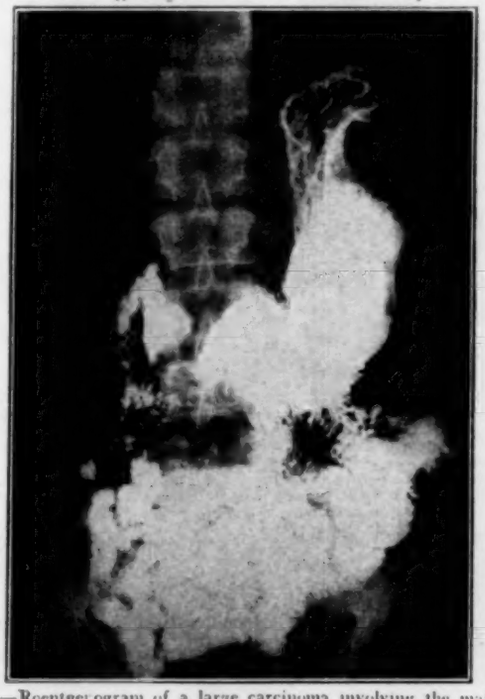

Fig. 8.—Roentgenogram of a large carcinoma involving the majority of the body and fundus of the stomach. Total gastrectomy is required to remove all the growth.

2. *Roentgen Examination*.—Without question the most valuable method of investigation in cases of suspected carcinoma of the stomach is the fluoroscopic study of the behavior of the stomach after the ingestion

5. Wangensteen, O. H.: The Problem of Gastric Cancer, J. A. M. A. 134: 1161-1169 (Aug. 2) 1947.

6. Pack, G. T., and McNeer, G., in discussion on Wangensteen.[5]

of a barium meal and the demonstration by roentgenograms of the presence of a persistent filling defect in the gastric shadow. The characteristic findings have been described so frequently that they need not be set forth here. Figure 8 serves to illustrate a classical example of the roentgen appearance of a case of carcinoma of the body and fundus of the stomach. This patient was operated on successfully. A reproduction of the postoperative roentgen appearance is given in figure 9, showing the appearance of the anastomosis after the performance of a total gastrectomy.

In spite of the excellence of the method, however, it is not realized universally that the accuracy of roentgen studies in the establishment of a positive diagnosis of carcinoma of the stomach does not exceed 90 per cent in the best of hands.[7] In some cases, therefore, additional aid in making a diagnosis is necessary. This may be obtained by the use of the gastroscope or in some cases the esophagoscope.

Fig. 9.—Postoperative roentgenogram of case shown in figure 8 following total gastrectomy with restoration of the continuity of the alimentary canal by esophagoduodenal anastomosis (restoration of continuity after total gastrectomy is usually by an esophagojejunal anastomosis; in certain favorable cases, however, it is possible to use the duodenum for an end to end anastomosis with the esophagus). The operation was performed by the transthoracic approach.

3. *Endoscopic Examination.*—Direct inspection of the interior of the stomach by means of a gastroscope is a useful adjunct to the roentgen investigation in a few cases in which carcinoma of the stomach is suspected. The interpretation of the observations depends on the experience of the observer and on the location of the lesion. Lesions of the stomach located in certain areas, notably the fundus, cannot be seen readily through a gastroscope. In the body and antrum, however, the method is most useful and in some cases has been the means of demonstrating the actual presence of a carcinoma which may not have been visualized by the use of roentgen methods even though it had been suspected on the basis of the history and physical examination. The limitations of the gastroscope are such, on the other hand, that, although the lesion may be seen, a specimen cannot be obtained for biopsy purposes.

In certain cases in which the growth lies at the cardia or in the fundus of the stomach, it can be seen best through the esophagoscope. In such cases, because of the construction of the instrument, a piece of tissue can usually be obtained for histologic confirmation of the diagnosis.

Occasionally peritoneoscopy is of value, not so much to prove the presence of a growth in the stomach as to detect the presence of metastases in the liver or elsewhere throughout the abdominal cavity. This procedure is therefore of relatively little importance as an aid to the establishment of an early diagnosis in gastric carcinoma. It serves rather as a method of predicting the operability or possible curability in the more advanced cases.

4. *Cytologic Examination.*—A new method in the field of diagnosis in carcinoma of the stomach is the cytologic examination of the gastric contents as set forth by Papanicolaou[8] and others. This involves the study of a stained specimen obtained from the sediment of the fluid aspirated out of the stomach. The success of its application depends on the knowledge and experience of the technician who may be called on to express an opinion on the basis of an examination of the smear. In the hands of an experienced person, however, characteristic tumor cells can be demonstrated, and in some cases a definite diagnosis of carcinoma can be made. As more experience is accumulated, this method gives promise of greater usefulness in the confirmation of a diagnosis of carcinoma of the stomach. It may also become a useful means of detecting early cases in which there is only a reasonable suspicion on the basis of the history, roentgen studies and endoscopic observation of the presence of the disease.

5. *Exploratory Operation.*—The importance of an early diagnosis and the prompt removal of the growth in gastric carcinoma is such that surgical exploration should be used in every suspected case when other diagnostic methods prove inconclusive. This is important not only in all suspected cases, but also in all cases of gastric ulcer which is presumed to be benign but which does not heal after a reasonable period of observation. The danger of treating an early ulcerating carcinoma of the stomach as though it were a benign ulcer because of the roentgen appearance, the possible absence of achlorhydria or even the opinion of the endoscopist is so great that the majority of experienced surgeons and internists agree that in every case of gastric ulcer which does not heal completely within a short period of time (one month at the utmost) resection should be done as though it were a proved case of gastric carcinoma. Only in this way will the outlook of the patient be safeguarded and the physician preserved from embarrassment in certain cases, many of which will inevitably turn out to be early enough to be cured.

TREATMENT

As in carcinoma of the esophagus, the only prospect of cure in carcinoma of the stomach results from a total extirpation of the growth by surgical means. This may involve the removal of the lower half or more of the stomach through an abdominal incision, the extirpation of the proximal half or more of the stomach through a transthoracic or abdominothoracic approach or the performance of a total gastrectomy by either the abdominal or the transthoracic route. The exact details of the technic and the choice of procedure to be employed must depend on the location and extent of the growth in the stomach and on the judgment of the surgeon. As with carcinoma everywhere, the fundamental principle to be observed in all cases in which there is a reasonable hope of cure is to remove the tumor-bearing

7. Harnet, W. L.: A Statistical Study of 1,405 Cases of Cancer of the Stomach. Brit. J. Surg. 34: 379-385, 1947.

8. Papanicolaou, G. N.: Diagnostic Value of Exfoliated Cells from Cancerous Tissues, J. A. M. A. 131: 372-378 (June 1) 1946.

portion of the stomach with as large a margin of apparently normal stomach as seems practicable, along with the regional lymph nodes and the great omentum.

PROGNOSIS

All that was said regarding the factors which influence the prognosis in cases of carcinoma of the esophagus applies to the situation in gastric carcinoma. Early diagnosis and prompt radical surgery provide the only hope for the patient. But because of the much longer period of time during which extirpation has been practiced in the treatment of carcinoma of the stomach, it is possible to make useful predictions regarding the prospects of patients with the disease based on surgical experience and the correlation between end results and the pathologic characteristics of the growth. As pointed out by Welch[9] an excellent prognosis for cure can be made in cases of carcinoma in situ or in growths which are of a polypoid nature. A fair prospect can be assumed for patients with an adenocarcinoma or a colloid adenocarcinoma or in any patient who is found to have no metastases in the regional lymph nodes. A poor prognosis must be made in case the tumor is of a signet ring cell type or in cases of histologically undifferentiated tumors. The same is true in all cases in which lymph node metastases are found or when the growth in the stomach is adherent to other viscera, both evidences of a long duration or a high degree of malignancy of the tumor. It has been observed by Welch that if lymph nodes which are obviously invaded by tumor are left behind, the average duration of life is eight months. This observation provides further support for the insistence of all surgeons who may be called on to treat patients with carcinoma of the stomach that the earliest possible diagnosis must be made if the surgical removal of the growth is to prove effective.

On the other hand, even though the diagnosis may be made early in the course of the disease, the outlook for the patient afflicted with carcinoma of the stomach depends on the histologic type of growth which he may happen to have. Table 3, which is adapted from the report of Welch, serves to emphasize the importance of this fact. From this it will be seen that the prospect varies from almost 100 per cent cure in carcinoma in situ to no five year survivals in the case of the signet ring type or an undifferentiated growth. The most frequent histologic type is the adenocarcinoma.

TABLE 3.—*Five Year Survival Rate of Carcinoma of the Stomach According to the Histologic Type* *

	Percentage of Patients Operated On
Carcinoma in situ	90+
Polypoid carcinoma	75
Adenocarcinoma	40
Colloid adenocarcinoma	40
Signet ring (pure colloid) carcinoma	0
Undifferentiated carcinoma	0

* Massachusetts General Hospital statistics.

Although the results of treatment of carcinoma of the stomach may leave much to be desired, it is obvious that they are now much better than they were even ten years ago. It is time, therefore, to abandon the old attitude of hopelessness and to accept the present day realization of the fact that, given an early diagnosis and a reasonably favorable pathologic type of growth, carcinoma of the stomach can be cured in an appreciable number of cases.

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Clinical Notes, Suggestions and New Instruments

THROMBOPENIC PURPURA FOLLOWING QUINIDINE

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Thrombopenic purpura following the administration of quinine occurs occasionally,[1] but thrombocytopenic purpura following the use of its optical isomer quinidine is, apparently, extremely rare. The only case in the literature is one concerning a 27 year old woman who during a second course of quinidine sulfate therapy had hemorrhages in the skin and gingival bleeding after taking a total dose of approximately 8 Gm. of the drug.[2] When the patient had completely recovered, the clinical and hematologic picture was reproduced by the administration of one dose of 0.4 Gm. of quinidine sulfate.

We wish to report another instance of this idiosyncrasy to the drug.

REPORT OF CASE

An Italian-born seamstress aged 57 years with hypertensive and rheumatic heart disease was admitted to this hospital Aug. 1, 1947, complaining of dyspnea of two weeks' duration and frequent attacks of paroxysmal tachycardia over many years. There was no history of allergy, bleeding tendency or previous quinidine therapy. She had had widespread tuberculosis of bone in childhood and rheumatic fever at the age of 20.

On admission the patient was in moderate congestive heart failure. She was digitalized and discharged three weeks later on a maintenance dose of 0.1 Gm. daily. On September 1 she was readmitted complaining of frequent attacks of palpitation which were shown electrocardiographically to be bouts of supraventricular tachycardia. Digitalis was discontinued, and on September 20 quinidine sulfate was begun in a dosage of 0.2 Gm. three times daily. She suffered no further attacks and was discharged September 28 on a maintenance dose of 0.6 Gm. daily.

On October 1, after a total dose of 6.0 Gm. of the drug had been taken, spontaneous bleeding from the gums developed, and the patient was readmitted. On physical examination she displayed, in addition to the gingival bleeding, petechiae in both conjunctivas and widespread purpura of the trunk and limbs. The temperature was 99 F., pulse rate 88, and blood pressure 150 systolic and 60 diastolic. The spleen, not felt on previous admissions, was palpable 2 fingerbreadths below the costal margin. The result of the tourniquet test for capillary fragility was strongly positive. The bleeding time (finger prick) was over 30 minutes; coagulation time (Lee-White) 7 minutes; clot retraction, none in 3 hours, and the prothrombin time was normal. The platelet count (oxalated venous blood) was 4,000 per cubic millimeter. The blood count revealed 4,700,000 red blood cells, 13 Gm. of hemoglobin and 8,300 white blood cells with a normal differential count. A sternal marrow aspiration showed cellular marrow with a normal differential count and with megakaryocytes present and normal in number and appearance. A transfusion of 500 cc. of three day old citrated blood was begun. Five hours later, seventeen hours after its beginning, the mouth bleeding stopped. Subsequent

From the Service of Dr. Milton B. Rosenbluth, Third (New York University) Medical Division, Goldwater Memorial Hospital.

1. Siegenbeek van Heukelom, A., and Wahab: Thrombocytopenic Purpura Due to Idiosyncrasy to Quinine, Geneesk. tijdschr. v. Nederl.-Indie 81:906-916 (April 29) 1941; addendum, ibid. 81:1078 (May 13) 1941. Bais, W. J.: Another Case of Thrombocytopenic Purpura Due to Idiosyncrasy to Quinine, ibid. 81:2213-2215 (Oct. 14) 1941. Beiglboch, W.: Ein Fall von thrombopenischer Purpura bei echter Chinenuberempfindlichkeit, Ztschr. f. klin. Med. 131:308-316, 1937. Fasal, P., and Wachner, G.: Symptomatische thrombopenische Purpura als Folge einer Chinin-Safran-Intoxikation, Wien. Klin. Wch. 46:747-750 (June 16) 1933. Maritschek, M., and Markowicz, H.: Ueber einen Fall von Chinenuberempfindlichkeit mit Purpura, vorwiegend der oberen Luft and Speiseweg, Monatschr. Ohrenh. 67:410-414 (April) 1933. Peshkin, M. M., and Miller, J. A.: 102:1737-1740 (May 26) 1934.

2. Broch, O. J.: Thrombocytopenic Purpura After Administration of Quinidine, Nord. med. 10:1542-1544 (May 17) 1941.

platelet counts were: October 4, 14,000; October 6, 36,000; October 8, 152,000, and October 16, 187,000. On the third day the tourniquet test became negative in result and the bleeding time returned to normal. Two blood cultures were sterile.

Since quinidine might clearly be the drug of choice for future use it seemed wise to make certain that the clinical impression that the drug was responsible for the bleeding was correct. Therefore, after complete recovery from the bleeding episode, a test dose of 0.1 Gm. quinidine sulfate was given by mouth. The developments were striking. At the end of one hour the platelets dropped to 17,000 per cubic millimeter, in two hours to 3,000 and in three hours to 1,000. At this time bleeding from the gums began, followed by profuse bleeding from the nose, and the appearance of widespread purpura of the trunk and limbs as before. Six hours after the test dose the platelets fell to zero. The patient was given 500 cc. of three day old citrated blood. All bleeding ceased completely twenty-one hours after the test dose and within seven days the platelet count, tourniquet test, clot retraction and bleeding time returned to normal.

SUMMARY

A case of thrombopenic purpura secondary to quinidine sulfate is reported. The patient gave no history of previous quinidine therapy. The bleeding episode developed after 6 Gm. of the drug had been taken. An almost identical episode was induced by the administration of a test dose of 0.1 Gm. of the drug.

Council on Foods and Nutrition

This paper, prepared at the request of the Council on Foods and Nutrition, is one of a series which will appear in THE JOURNAL. The entire series will appear later in book form as the Council's Handbook of Nutrition.

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FAT IN NUTRITION

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Man through his evolutionary changes has developed into an animal whose gastrointestinal tract has been modified to such a state that considerable portion of fat is desirable in his diet. Although a certain amount of bulk is recognized as being of value in a complete diet, there are limits to which this should be extended. When the bulk of the diet is increased by the incorporation of considerable amounts of carbohydrate, discomforts which are ascribed to abnormal fermentation in the gut are encountered. McClendon,[1] in his investigation of the dietary habits of the Japanese, was impressed by the prevalence of "dyspepsia" in that population and believed that the incapacitation which occurred for comparatively long periods was undoubtedly due to the high carbohydrate diet. The bulk of the diet can be significantly decreased by the incorporation of additional fat, because this foodstuff supplies more than twice the number of calories available from equivalent amounts of protein or carbohydrate. Unlike the other organic dietary substances, fats are almost water free, and this also leads to a decrease in the bulkiness. Starling[1] pointed out that the human alimentary tract is so constructed that it is desirable to include from 20 to 25 per cent of the calories in the form of fat. The desirability of fat in the diet was illustrated during the first great war by the experience of the German population, which regarded the low daily fat allotment as one of their most serious deprivations. It is common knowledge that a meal containing insufficient amounts of fat lacks in the so-called staying powers. Starling[1] illustrated this by the complaints, during the latter stages of the first world war, of laborers that their rations were inadequate to work their normal shifts because of the low fat content. Hunger was the universal reaction. From a biologic point of view, it is recognized that fats are absorbed at a slower rate than carbohydrate, and, in addition, reduce the rate of discharge of gastric contents. The latter effect is ascribed to the inhibitory action of the hormone enterogastrone, the formation of which, in the intestine, is accelerated by the presence of fat.

The animal organism is well adapted to assimilate comparatively large amounts of fat. Cowgill[2] has recently reviewed the subject. Langworthy[3] studied the digestion and utilization of a considerable number of plant and animal fats by healthy adults and observed no notable variations between the behavior of the different types. The daily consumption ranged from 50 to 100 Gm. These observations and others led Cowgill to the following summation: "Edible fats the melting points of which are not too high to prevent liquefaction in the alimentary tract are digested and absorbed to about the same degree. Such differences as have been found are of no practical nutritional significance."

The influence of physical properties on the utilization of fat is well illustrated in the coefficients of digestibility of natural fats hardened to various extents by hydrogenation. Holmes and Deuel[3] observed that the degree of utilization of such products decreased significantly with the rise in melting point. The melting point of fats is to a considerable extent dependent on the chemical nature of the constituent acid radicals in the fat (triglyceride) molecule. Such fats are readily hydrolyzed in the presence of excess hydroxyl ions or specific enzymatic catalysts with the liberation of one molecule of glycerol and three of fat acids. The term "fat acids" has recently been introduced to designate the acids originating from natural fats.

In general, the acids in the fat molecule differ from one another and the term "mixed glyceride" is employed to characterize this type of lipid. This is illustrated in the following formula:

$$\begin{array}{l} CH_2{-}O{-}CO{-}(CH_2)_x{-}CH_3 \\ | \\ CH{-}O{-}CO{-}(CH_2)_y{-}CH_3 \\ | \\ CH_2{-}O{-}CO{-}(CH_2)_z{-}CH_3 \end{array}$$

The values for x, y, and z are even numbers ranging from 2 to more than 20. As a rule the chief acidic constituents of the fats in the depots and tissues of mammals contain from 16 to 18 carbon atoms. It does not seem necessary to detail a listing of the numerous fat acids that have been isolated from natural sources, since that information is readily available in standard texts of biochemistry. It should be sufficient to call attention to the fact that fat acids fall into two distinct groups, the saturated type, most representatives of which are solid at room temperature, and the unsaturated class, all members of which are liquid at this temperature. Both groups belong to the same homologous aliphatic series. Quantitatively, palmitic acid, a saturated acid with 16 carbon atoms, and oleic acid, with 18 carbon atoms and 1 unsaturated double bond, predominate in the depot fat of man. Stearic acid, the saturated acid which contains 18-carbon atoms, is occasionally present in considerable amounts in animal depot fat, and when this occurs the melting point of

1. Cited by Anderson and Williams.[11]

2. Cowgill, G. W.: Relative Nutritive Values of Animal and Vegetable Fats, Physiol. Rev. 25:664 (Oct.) 1945.

3. Cited by Cowgill.[2]

the mixture rises. When oleic acid is hydrogenated, a product identical with natural stearic acid is produced. Vaccenic acid, an isomer of oleic acid, also gives rise to stearic acid when hydrogenated. Two additional unsaturated acids, linoleic and linolenic, occur in abundance in certain culinary fats of plant origin. Both belong to the C-18 series, the former containing two, the latter three double bonds, and each in turn can be transformed into stearic acid on complete hydrogenation. Fish oils contain comparatively large amounts of acid of higher molecular weight with additional double bonds.

Culinary fats, while they are characterized by the presence of predominating amounts of the triglycerides (more than 95 per cent), also contain small amounts of the more complex lipids and usually some of the fat-soluble vitamins and pigments. These complex lipids fall into three divisions, the phospholipids, the glycolipids (also designated as cerebrosides), and the sterols. The majority of the phospholipids are closely related to the triglycerides in so far as glycerol is obtained on hydrolysis, but only two fat acids are liberated. The third hydroxyl group of the glycerol molecule is joined to a phosphoric acid linkage, which, in turn, is conjugated with a nitrogenous product. Three such phospholipids have been characterized: lecithin, in which the nitrogenous base, choline, is present, cephalin, containing aminoethyl alcohol, and phosphotidyl serine, in which the nitrogenous constituent is the amino acid serine of wide distribution in the proteins. It is to be noted that in these lipids the ratio of nitrogen to phosphorus is 1 : 1. In contrast, an entirely different type of phospholipid, sphingomyelin, occurs in nature. This contains no glycerol, 1 mole of phosphoric acid, and two nitrogenous fractions, choline and sphingosine. The latter, an unsaturated amino alcohol of high molecular weight, also occurs in the glycolipids, which, in addition, yield 1 mole of fat acid and one simple sugar (galactose or glucose) on hydrolysis. Even more complex glycolipids, the gangliosides, have been described. These contain 1 mole of fat acid, two or three of the simple sugars and an additional nitrogenous product which has not yet been structurally characterized.

The sterols, alcohols of high molecular weight, belong to a group of compounds, the steroids, which include the bile acids, sex and adrenal cortical hormones,

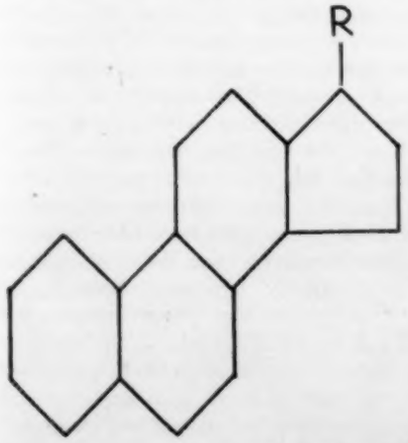

Chart showing characteristic perhydrocyclopentanophenanthrene nucleus.

toad poisons and the digitalis saponins. All contain the characteristic perhydrocyclopentanophenanthrene nucleus shown in the chart. The steroids differ from each other by variations in the composition of the side chain (R in the type formula), the degree of saturation of the nucleus, and the number and site of attachment of hydroxyl groups on the nucleus. Of the considerable number of sterols that have been isolated from natural sources, cholesterol is of paramount physiologic significance, since it is the only one which is utilized by higher animals. Due to the presence of an hydroxyl group, cholesterol can exist in the free or esterified form. It is the chief sterol in the animal kingdom, and one of its derivatives, 7-dehydrocholesterol, is recognized as the precursor of a naturally occurring antirachitic vitamin (D_3). Ergosterol, which occurs only to a small extent in animal tissues but in considerable amounts in such lower plants as yeasts and fungi, is the provitamin of vitamin D_2. A number of additional sterols are rather widely distributed in the plant kingdom, but, like ergosterol, none of these plant products are utilized to any appreciable extent by mammalia.

While these complex lipids are present in only minute amounts in the culinary fats and fat depots, they do make up a major fraction of the lipids of the organs. This is illustrated in the accompanying table.

*Distribution of Lipids in Organ and Depot Fats**

Species	Site	Phospholipids	Cerebrosides	Cholesterol	Triglycerides
Beef	Brain	52	23	19	6
Beef	Liver	70	0	4	25
Beef	Kidney	63	4	1	28
Beef	Intestine	60	3	13	24
Beef	Muscle	27	8	2	62
Beef	Butter	Trace	Trace	Trace	98+
Chicken	Egg yolk	26	2	4	66
Man	Depot	Trace	Trace	Trace	98+
Hog	Depot	Trace	Trace	Trace	98+

* All values are expressed as percentage of total lipids. As will be emphasized later, the content of these complex lipids, particularly the phospholipids, is large in the tissues of greatest physiologic importance.

Consideration of the facilities for fat digestion and absorption shows that ample provision is made for the assimilation of considerable amounts of fat. So far as the stomach is concerned splitting of fat by enzymes (lipases) is at best only of minor importance. Nevertheless the organ assists materially in both digestion and absorption in that it serves as reservoir from which the chemically unaltered fat is discharged at such a rate that the small intestine is not overtaxed. The presence of fat in the meal considerably influences gastric function. Fatty meals leave the stomach much slower than those with large contents of the other organic foodstuffs, and when fat finds its way into the small intestine, it stimulates the production of enterogastrone, a hormone, which, in turn, slows down gastric motility. Of the enzymes having lipolytic action, steapsin, elaborated in the pancreas, is regarded to be the chief one concerned with fat digestion. Its activity is accelerated by soaps and the bile acids. The p_H of the small intestine (close to neutrality) also favors the catalytic action of the enzyme. One of the chief properties of the bile is its ability to lower surface tension, which materially speeds up digestion of fat. The small intestine secretes its own particular lipase, and, under certain circumstances, this catalyst can take over the splitting of fat. Data from experiments in which a partial pancreatectomy had been performed indicate that the factor of safety is large, and even in the completely depancreatized dog, maintained with insulin and certain lipotropic products, interference with the digestion of fat is not a problem. Nevertheless, the reports of the extreme diarrheas encountered in some cases of

pancreatic insufficiency illustrate the importance of this organ in the utilization of fat.

It is generally accepted that the bile is the most important single secretion concerned in the absorption of fat, and of the biliary constituents, the bile acids are of utmost significance. Data obtained from the steatorrhea associated with obstructive jaundice clearly demonstrate that the abnormality consists not in a failure in the splitting of fat but in the impaired absorption of the fat acids liberated in digestion. These bile acids are believed to combine with the water-insoluble acids liberated by the lipases, to form complexes which are soluble in the intestinal medium and, in this form, pass into the intestinal wall. The pathway for the absorption of fat differs from that of protein and carbohydrate in that the major fraction of the fat enters the body through the lymphatic system. Furthermore, unlike the situation which prevails for the other two major organic foodstuffs, the products liberated by the splitting of fat once having passed into the intestinal mucosa reunite to again form the triglyceride. Phosphorylation is believed to be a factor operating in this resynthesis. This conception was proposed by Sinclair,[4] who observed that, whereas the quantity of phospholipid in the intestinal mucosa was not increased after the ingestion of fat, nevertheless the type of the individual fat acids carried by the phospholipid molecule was primarily dependent on the chemical composition of the dietary fat. He hypothecated the formation of an intermediate phospholipid in the resynthesis. This concept gained strength from more recent work with radioactive phosphorus. Data obtained with this tool [5] indicate that phospholipids are being continuously reformed in the small intestine and that, while this activity continues during inanition, the rate of the reaction is considerably accelerated after the oral administration of fat.

While the concept that the splitting of fat is a requisite for absorption is substantially supported by reliable and clearcut chemical findings,[6] nevertheless evidence has been presented in support of an alternate view. According to Frazer, of England, unsplit fat passes directly into the lacteals, while fat acids, liberated by digestion, pass directly into the portal system and at once to the liver. It is beyond the scope of this article to present the data on which this view is based, and the reader is referred to Frazer's recent review [7] for such information.

In considering the fate of the absorbed fat acids, several pathways are open. They may be incorporated into the more complex lipids, deposited as such in the fat depots, converted into other fat acids, excreted through the gut, be involved in the production of milk fat, transformed into carbohydrate or oxidized to carbon dioxide and water with the liberation of energy.

As has already been mentioned the dietary acids become incorporated into the phospholipids within the intestinal mucosa. Studies with hepatectomized dogs have shown that whereas the phospholipids of the small intestine can originate in these organs themselves, those of the blood plasma owe their existence to the liver.[8] Some years ago Bloor [6] proposed that fat acids were transported in the body in the form of phospholipids, and that of these, lecithin was most important. The evidence for this singular role was not good, but more recent findings [9] indicate that the circulating phospholipids are of the choline-containing (lecithin and sphingomyelin) type.

Further evidence that such phospholipids play a predominating role in fat transport has been supplied by experiments with rats on diets high in fat and low in protein content. Under such circumstances, fat accumulates in large amounts (more than 30 per cent) in the liver. The incorporation of choline or of additional protein in the diet prevents this abnormal infiltration of fat. This so-called lipotropic effect [10] of protein is ascribed to its content of methionine, an amino acid containing a labile methyl group which can be utilized for the synthesis of choline. Both methionine and choline influence lipid metabolism by accelerating the phospholipid turnover in the liver. Investigations with depancreatized dogs, maintained with insulin, have contributed further to the problem. Such animals eventually have fatty livers and, in addition, exhibit a fall in the plasma phospholipids, which, as has been noted, are primarily of the choline-containing type. This can be prevented by the administration of choline or extracts of the pancreas. The effect of the latter cannot be accounted for entirely on the basis of the choline content and, according to Dragstedt,[11] this pancreatic factor, to which he has given the name "lipocaic," is a product of the internal secretion of the pancreas. This has been denied by several groups of investigators, particularly Chaikoff and collaborators, who maintain that the factor is present in the external secretion of that gland.

In addition to phospholipid, it is likely that some transport of fat acids is accomplished through the medium of the cholesterol esters of the blood plasma. As a rule the fat acids, thus combined in the plasma, are the most highly unsaturated ones in that circulating fluid, and it is generally agreed that the esterification occurs in the liver. In this connection it might be well to recall the striking observation that in the depancreatized dog maintained with insulin the decided rise in lipid content of the liver is often accompanied by the complete disappearance of cholesterol esters from the plasma. The administration of pancreatic extracts not only remedies the situation, but even results in a rise in values to somewhat above the normal level.

In considering the fate of fat acids transported in this manner it should be emphasized that the current conception differs extensively from those which were popular less than two decades ago. The discovery of deuterium and other isotopes and the development of methods for their preparation in suitable amounts led to biochemical investigations which practically revolutionized teachings on the fate of physiologic substances.[12] Formerly it was commonly believed that

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11. Dragstedt, L. R.: The Present Status of Lipocaic, J. A. M. A. **114**: 29 (Jan. 6) 1940.

12. Schoenheimer, R.: The Dynamic State of Body Constituents, Cambridge, Mass., Harvard University Press, 1942.

dietary fats were burned soon after absorption had occurred and that, when the caloric requirements of the organism had been met, any excess of fat was conveniently stored in the fat depots. There it remained until the demands for energy were not fulfilled by the diet, whereupon it was mobilized and burnt. Currently it is held that the fat depots are by no means inert materials, but are tissues in a considerable state of flux. Dietary fat acids merge with those of the fat depots, and this mixture is constantly transported to and from the organs. These newer conceptions are based essentially on data secured by Schoenheimer from experiments in which fat acids labeled with deuterium were fed to white mice and rats. In a typical experiment deuteropalmitic acid was fed and the fat acids of the organs and tissues fractionated. Of the labeled product fed a considerable fraction (more than 40 per cent) found its way to the tissues and organs as such, part was degraded to the lower homologues, myristic and lauric acids, another fraction was converted to stearic acid, a higher homologue, and an additional portion to the unsaturated acid, oleic acid. None of the more highly unsaturated ones, linoleic and linolenic, were formed. In this connection mention should be made of the demonstration [13] that fat acids of this type are essential constituents in the diet of the white rat. In their absence retardation of growth becomes evident, renal lesions appear and untimely death occurs. One of the early symptoms exhibited is scales on the feet. Only isolated experiments have been carried out with other species. In one experiment with man in which an adult was maintained for six months on an extremely low fat diet, a definite fall in the linoleic acid content of the circulating lipid was observed. A similar fall has been recorded for the serum lipids of infants with eczemas. Most of such cutaneous disorders were reported as "cured" or "greatly alleviated" when fats containing the more highly unsaturated acids were included in the diet.

The dynamic state of the tissues was demonstrated further by Schoenheimer's observation that fat acids labeled with deuterium eventually disappeared from the body even though the caloric requirements had been met. In mice, the half life cycle of such products ranged from five to eight days. This state of flux is believed to be the physiologic explanation for the formation in the tissues of the type of fat characteristic for a particular species ingesting a diet not particularly high in fat content. When, however, the diet includes considerable amounts of that foodstuff the situation is altered, and now the depot fat begins to closely resemble the dietary fat in chemical composition.[14] This is of considerable economic significance to the swine husbandry industry, which supplies such enormous amounts of culinary fat to the trade. When, for example, certain vegetable foodstuffs, high in a content of fat of low melting point, are incorporated in the diet of hogs the so-called "soft pork" grade, which is more liquid than the usual type of hog depot fat, is deposited. While this product is unquestionably a satisfactory nutrient, the market value is below that of the firmer grades. Owing, however, to the state of flux, it is possible to remedy the situation by merely changing to a diet containing small amounts of the liquid acids and comparatively large amounts of the saturated ones or by supplying a ration in which most of the fat has been replaced by carbohydrate. In the former instance the dietary fat eventually replaces the more liquid type, while in the latter case the excess of carbohydrate is transformed into the acids, and these in turn are deposited.

The physiologic transformation of carbohydrate into fat was first conclusively demonstrated by Lawes and Gilbert [15] in 1877. During the interim, repeated confirmations have been supplied, but the mechanism of the synthesis still remains somewhat obscure. In recent experiments in which the body fluids of mice were enriched with deuterium, the fat acids of the depots were found to contain the isotope. The diet was so low in fat that a synthesis from carbohydrate must undoubtedly have taken place, and the concentration of the isotope and its distribution along the chain was such as to suggest that in this biologic process a condensation of a considerable number of small units had taken place.[12] This hypothesis is further supported by the report [16] that isotopic acetic acid can be utilized for the synthesis of the higher fat acids. In these experiments both the carboxyl-carbon atom and the hydrogen of the methyl group were labeled. The analysis of the fat acids for deuterium resulted in data which could be best explained on the basis of the condensation of many 2 carbon units.

The 2 carbon fragment is also involved in the degradation of fat acids. In 1905 Knoop [17] proposed a mechanism for the oxidation of such acids whereby the long chain was oxidized at the beta carbon atom with the resulting loss of a 2 carbon unit. It was further suggested that the fission progressed successively in such an orderly manner that no matter which fat acid was being catabolized eventually 1 mole of butyric acid was formed. This was subsequently oxidized at the beta carbon atom with the production of the ketone bodies. Knoop's contention received support from the work of Dakin,[17a] who demonstrated that beta oxidation could occur in vitro and isolated some of the intermediates of the reaction. The idea was further substantiated by Embden's observation [18] that the perfusion of fat acids through the liver resulted in the liberation of acetone. In addition it is common knowledge that ketone bodies are formed during the catabolism of fat by man. In the healthy person the urinary excretion of such ketones is increased by the excessive oxidation of fat as it occurs on a high fat diet or as in fasting. For the same reason ketonemia and ketonuria are common occurrences in uncontrolled diabetes mellitus. While this classical theory, whereby oxidation occurs at the beta carbon atom, has stood the test of time, the corollary, that the oxidation of 1 mole of any particular fat acid gives rise to only 1 mole of the ketone body, is currently not accepted. Stadie [19] has recently reviewed the literature on this phase of the problem. Two alternate proposals have been made. One of these,

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19. Stadie, W. C.: The Intermediary Metabolism of Fatty Acids, Physiol. Rev. **25**: 395 (July) 1945.

first suggested by Hurtley [20] in 1916 and revived by Jowett and Quastel [21] in 1935, postulates that the chain is oxidized simultaneously along its whole length at alternate carbon atoms beginning at the beta position. As a result the whole molecule is converted into ketones which break up to form 4 carbon chains. Accordingly, beta-oxybutyric acid is again formed, but under these circumstances butyric acid would yield 1 mole; octanoic, 2; lauric, 3, and palmitic, 4 moles of the ketone bodies. Previously it was assumed that only 1 mole would arise from all of the acids. While this newer suggestion is compatible with a considerable amount of data accumulated from experiments with liver slices as well as with healthy intact animals, divergent reports are also available. Thus the 5 carbon chain of valeric acid gives rise not only to glucose but also to acetone, suggesting the condensation of two 3 carbon chains to form the sugar, and of two 2 carbon fragments to give rise to the ketone. Other acids containing an odd number of carbon atoms have been shown to be both glucogenic and ketogenic. In addition Deuel and co-workers observed a greater increase in the ketone excretion following the oral administration of hexanoic acid to the intact white rat than when butyric acid was given. These and other observations led MacKay [22] to propose that oxidation of fat acids proceeded at the beta-carbon atom, as suggested by Knoop, but that the 2 carbon fragment, liberated in this manner, recombined to form the ketone bodies. The report that acetic acid, administered per os to rats, is converted to aceto-acetic acid is in good accord with this conception. Furthermore, when octanoic acid, containing the C^{13} isotope in the carboxyl group, was equilibrated with liver slices the distribution of the tag in the isolated aceto-acetic acid was in close agreement with values predicted on the basis of this beta-oxidation-condensation theory. Schoenheimer's [17] observation that deuteropalmitic acid gives rise to deuteromyristic acid is further proof for the removal of the 2 carbon fragment. On the other hand, Stadie [18] pointed out that some experiments with beta-hydroxybutyric acid led to data more in accordance with values to be expected on the basis of multiple alternate oxidation as proposed by Hurtley.[20] Evidently both mechanisms can operate, and, at present, it seems advisable to defer judgment concerning the predominance of either path.

According to Verkade [23] still another path is open for the catabolism of fat acids. In this scheme the terminal methyl group is first oxidized with the formation of a dicarboxylic acid, which is in turn successively oxidized at the two positions beta to the carboxyl groups. While there is some experimental justification for this proposal, it is generally believed that, even though this so-called omega-oxidation may operate, the amounts of acids thus catabolized are so minimal that in the end this route is of little physiologic importance.

It is generally agreed that the complete oxidation of fat acids to carbon dioxide and water takes place in two stages. The initial one, which occurs almost exclusively in the liver, results in the formation of the ketone bodies, already referred to. It has been reported [24] that the presence of adenosine-triphosphate, or a system giving rise to it, is necessary for this first phase. The second one, which takes place almost entirely in the extrahepatic tissues, particularly the kidneys and muscles, consists of the disposal of the 4 carbon chain with the production of water and carbon dioxide. It has been suggested that certain intermediates, which also have been found to operate in the final disposal of carbohydrate, are involved in the ultimate breakdown of fat. Direct evidence for this idea has been supplied by Buchanan and others,[25] who incubated tagged acetate and aceto-acetate with kidney homogenates and detected the isotope (C^{13}) in the alpha-keto-glutaric, fumaric and succinic acids isolated from the reactions mixture. All three had previously been shown to be members of the tricarboxylic acid cycle involved in carbohydrate catabolism.

While it is probable that the 2 and 4 carbon metabolites can be disposed in the manner described, sight should not be lost of other paths for the utilization of the acetate fragment. Thus the conversion of this short chain to the higher fat acids has been demonstrated, the synthesis of cholesterol from acetate accepted, and the utilization of the acetyl group for the detoxication of certain amines established. Acetate and aceto-acetate have also been assigned the role of intermediates by some investigators in their proposed scheme for the conversion of fat to carbohydrate. This issue continues to be exceedingly controversial, and, while some of the more recent findings favor the interconversion, an evaluation of the evidence available generally leads to the verdict that the case has not been proved.

Fat acids need not follow any of the pathways outlined. This is illustrated in studies on the origin of milk fat. Currently it is held that the major portion of such fat arises directly from the triglyceride fraction of the blood lipids and that the chemical composition of it is, in turn, governed to a considerable extent by the dietary habits of the host. Hilditch,[26] of England, has clearly established that the chemical nature of the milk fat of the dairy cow can be significantly altered by dietary management. However, this comparatively simple explanation does not account for all the facts observed in this phenomenon. Butter obtained from the dairy cow, for example, contains unusually large amounts (8 to 10 per cent) of fat acids containing 4 to 10 carbon atoms. Similar observations are recorded for the milk fat of other ruminants, but the distribution of the individual constituents within this fraction varies significantly with the species. In contrast, the milk of the pig, the dog and the human being contains almost negligible amounts of these acids of low molecular weight, resembling in this respect almost all other natural fats. These inconsistencies cannot be ascribed to differences in dietary habits. Man is notable for his continued ingestion of cow's milk even after maturity has been attained. This does not occur in the dairy cow. If these particular acids are dietary in origin, the milk fat of the lactating woman should of necessity contain more and not less of such acids of low molecular weight. It has been suggested that the source of these fatty acids in the milk of ruminants

20. Hurtley, W. H.: The Four Carbon Atom Acids of Diabetic Urine, Quart. J. Med. **9**: 301, 1916.

21. Jowett, M., and Quastel, J. H.: Studies in Fat Metabolism, Biochem. J. **29**: 2143, 2159 and 2181 (Sept.) 1935.

22. MacKay, E. M.: Significance of Ketosis: Review Article, J. Clin. Endocrinol. **3**: 101 (Feb.) 1943.

23. Verkade, P. E.: The Role of Dicarboxylic Acids in Metabolism, Chem. & Ind. 57:704, 1938.

24. Lehninger, A. L.: The Relationship of the Adenosine Polyphosphates to Fatty Acid Oxidation in Homogenized Liver Preparations, J. Biol. Chem. **157**: 363 (Jan.) 1945.

25. Buchanan, J. M.; Sakami, W.; Gurin, S., and Wilson, D. W.: A Study of the Intermediates of Acetate and Aceto-Acetate Oxidation with Isotopic Carbon, J. Biol. Chem. **159**: 695 (Aug.) 1945.

26. Hilditch, T. P.: The Chemical Composition of Natural Fats, New York, John Wiley & Sons, Inc., 1940.

may be from the fermentation which takes place in the stomach. In this connection it should be recalled that such acids are not deposited in significant amounts in the tissues of the rat even though they may be supplied in abundant amounts in the diet. These observations and others have led to a belief that fat acids of low molecular weight are actually synthesized in the mammary gland and that the variations in the distribution of them in the milks of different species are to be ascribed to metabolic differences in their respective glands.

Cowgill [2] in his review devoted considerable space to the controversy on the relative nutritive value of butter fat and the margarines. He referred to the work by Schantz, Elvehjem, and Hart, of Wisconsin, who compared the nutritive value of mineralized milk rations, supplemented separately with a variety of vegetable fats and butter, and concluded that during their early life young rats receiving the ration containing the butter fat showed the best response in growth. In additional experiments these workers obtained data which led them to believe that butter fat is superior to the margarines so far as growth of young rats is concerned. The same group [27] recently determined the vaccenic acid (an isomer of oleic acid) content of a variety of fats and oils and reported that, whereas the acid is present in small amounts (less than 0.85 per cent) in butter fat, lard and beef fat, none was detected in the number of vegetable fats examined. This study followed a report [28] that the growth of rats on a ration containing rape seed oil as the source of fat was inferior to the rate observed when butter alone was employed as the dietary fat. The inclusion of 0.1 per cent of vaccenic acid in the rape seed oil diet resulted in a growth rate which practically duplicated the one recorded for the ration containing butter. It was suggested that superiority of butter fat over the margarines was due to the presence of vaccenic acid.

According to Cowgill, Deuel and collaborators were unable to demonstrate this superiority of butter. In a comprehensive investigation of the problem, this latter group observed satisfactory growth and reproduction of ten generations of rats during which time the butter fat of a ration, known to be satisfactory for growth and reproduction, was replaced by a margarine. Other investigators agreed with Deuel. In this connection the latter has remarked on the observation by Hilditch that human milk fat more closely resembles the margarines in chemical composition than does the fat obtained from the milk of the dairy cow. It should be pointed out that experiments have not been conducted with human subjects and that differences observed in the rat may not apply to man. In commenting on this problem Cowgill pointed to the differences in the rations employed, the strains fed and the conditions under which the investigations were carried out by the several groups, and suggested that the matter might be clarified by providing uniform conditions in future studies.

Turning now to the problem of the utilization of the complex lipids, it is evident that our knowledge of the digestion and absorption of these is scanty. With regard to the phospholipids, most of the data are limited to the lecithins. These are believed to be split by enzymes in the duodenum. At least this is the conclusion reached from data obtained on the composition of the thoracic lymph collected before and after the feeding of these particular phospholipids. To date it has not been established whether lecithins can enter the portal blood stream directly in the unsplit form. Studies on the utilization of cephalin and phosphotidyl serine have not been recorded, and those pertaining to sphingomyelin are fragmentary. With regard to the cerebrosides, the data available in the literature are few and conflicting. It is clear that this phase of lipid metabolism needs investigation. From some unpublished work obtained in this laboratory it is apparent that the lipid fraction of the brain, which contains considerable portions of all of these complex lipids, is reasonably well utilized, but not as well as the triglycerides. These studies have, however, not been carried beyond the preliminary stages.

In contrast to the lack of information referred to, the literature contains numerous investigations on the utilization of cholesterol and its esters. Much credit should be given to Gardner, of England, who initiated so many significant studies on the origin and fate of this sterol. As a consequence of the analysis of thoracic lymph, following the feeding of cholesterol and its esters, it has been established that regardless of whether fed in the free or esterified form, increases in both fractions occur in the lymph. This indicates that during absorption both esterification and hydrolysis occur in the small intestine. As a rule the absorption of cholesterol takes place best in the presence of dietary fat. This may be due to supplying fat acids for esterification. As in the case for fat, the absorption of cholesterol is accelerated by the presence of bile, and it is believed that this is accomplished by a combination of the alcohol with bile salts with the formation of soluble complexes.

It is agreed that all these complex lipids can be synthesized by higher animals from comparatively simple products. This is illustrated by experiments with rats on diets practically devoid of such lipids. In such circumstances, growth occurred with a corresponding rise in the content of these lipids in the tissues. Similarly it is evident that such lipids increase in amount in the suckling infant even though the milk contains insufficient amounts to account for the increment. According to Block and Rittenberg,[29] acetic acid, when fed to mice and rats, leads to the synthesis of cholesterol. The deuterium in the dietary acetate was present in both the nucleus and the side chain of the steroid.

Mention has already been made of the role of the phospholipids in fat absorption and transport. In addition they undoubtedly are intimately associated with other physiologic activity, inasmuch as the more active tissues contain the larger amounts of such lipids. Heart muscle, for example, contains practically twice as much as skeletal muscle. These lipids are intimately associated with protein, and it is believed that the lipids of blood plasma are combined with protein. The prosthetic group in the thromboplastic protein of plasma and tissues, so intimately associated with the clotting of blood, is considered to be a complex lipid of the phospholipid type. The role of cholesterol in the living organism is undoubtedly a manifold one. Its presence in practically all tissues indicates this. However, it is not possible to describe all of its various functions. Mention has

27. Geyer, R. P.; Nath, H.; Barki, V. H.; Elvehjem, C. A., and Hart, E. B.: The Vaccenic Acid Content of Various Fats and Oils, J. Biol. Chem. **169**: 227 (June) 1947.

28. Boer, J.; Jansen, B. C. P., and Kentie, A.: On the Growth Promoting Factors for Rats Present in Summer Butter, J. Nutrition **33**: 339 (March) 1947.

29. Block, K., and Rittenberg, D.: On the Utilization of Acetic Acid for Cholesterol Formation, J. Biol. Chem. **145**: 625 (Oct.) 1942.

already been made of its relationship to the natural form of vitamin D. In addition it can give rise to the bile acids and some of the sex hormones. Analyses of normal tissues have proved the presence of a variety of degradation products of cholesterol which conceivably can be considered to be the precursors of additional hormones.

The distribution of these complex lipids in the blood, during the postabsorptive state, and in the organs does not vary materially over considerable lengths of time in the healthy subject. As a rule the lipid levels in the corpuscles remain unaltered during disease, but definite fluctuations from the normal values are encountered in the plasma. The fall in cholesterol esters, observed in diseases of the liver, is ascribed to a failure in formation in that organ. Falls in total cholesterol values have been observed in certain infections, while hypercholesterolemia often accompanies nephrosis. The levels of plasma cholesterol vary appreciably with thyroid activity, being subnormal in hyperthyroidism and elevated above normal in hypothyroidism. The reader is referred to Bloor's monograph [30] for references to and a more detailed discussion of the variations in the levels of the plasma lipids under pathologic conditions. The role of the lipids in atherosclerosis has recently been reviewed.[31]

Variations from the normal lipid content are encountered in the organs of a number of pathologic conditions grouped as the "lipidoses." One of these, the xanthomatoses, is characterized by a deposition of cholesterol in large quantities in the tissues. In the xanthomatosis of the bones and organs and in the Schüller-Christian syndrome the plasma cholesterol levels are not elevated, whereas a definite hypercholesterolemia is commonly observed in xanthoma tuberosum. In the latter condition the treatment of the disease by prescribing a cholesterol-low or plant diet has been reported as successful. On the other hand, some patients do not respond in this manner to the change in diet. In Niemann-Pick disease the disorder is in the accumulation of sphingomyelin, while in infantile amaurotic familial idiocy (Tay-Sachs disease) the gangliosides increase extensively. Gaucher's disease is characterized by the deposition of large amounts of the cerebrosides, particularly in the spleen. In contrast to galactose, as is the case for the cerebrosides of the healthy subject, glucose was found to be the carbohydrate constituent of the lipid. With the exception of some of the xanthomatoses the levels of the individual lipids in the plasma in these pathologic conditions fall within the normal range, and no satisfactory explanation has been made for these unusual situations. A detailed description of these anomalies and speculations concerning their origin are available in a recent review.[32]

SUMMARY

1. The incorporation of suitable amounts of fat (triglycerides) in the diet increases the "staying power" of the ration and the substitution of fat for carbohydrate decreases fermentation in the gut.

2. Triglycerides of plant and animal fats are equally well digested and absorbed provided that liquefaction of these occurs in the small intestine. Plant sterols are not absorbed to any significant extent by man, while cholesterol, the chief sterol of higher animals, is well utilized.

3. Depot fats consist primarily of triglycerides. In contrast, cholesterol, the phospholipids and the cerebrosides occur in predominating amounts in the actively functioning organs of animals.

4. Pancreatic lipase and the bile salts are the chief factors in the digestion and absorption of triglycerides from the intestine.

5. Cholin-containing phospholipids are intimately associated with the transport of fat acids in the body. These acids may be incorporated in the complex lipids, deposited in the fat depots, converted to other fat acids, excreted into the gut, utilized in the formation of milk fat or oxidized to carbon dioxide and water with the liberation of energy.

6. While the majority of the fat acids can be synthesized by the animal organism, linoleic and linolenic are apparently exogenous in origin. Either one of the latter two is an essential constituent in the diet of the white rat, and may be required by man.

7. Degradation of fat acids takes place in two stages. The first phase, occurring almost exclusively in the liver, consists in the production of the ketone bodies, which are disposed of in the final stage in the extrahepatic tissue (notably in the kidneys and muscles).

8. With the exception of those of low molecular weight (C_4 to C_{10} inclusive) the fat acids of milk fat originate from the triglycerides of the blood. The composition of milk fat can be altered by dietary management. The controversy on the comparative nutritive value of butter and the margarines still exists.

9. Cholesterol, the phospholipids and the cerebrosides can be synthesized by the animal organism. Increased deposition of these occurs in the actively functioning organs in the different types of lipidoses.

30. Bloor, W. R.: Biochemistry of the Fatty Acids and Their Compounds, the Lipids, New York, Reinhold Publishing Corporation, 1943.

31. Hirsh, E. F., and Weinhouse, S.: The Role of Lipids in Atherosclerosis, Physiol. Rev. 23: 185 (July) 1943.

32. Thannhauser, S. J., and Schmidt, G.: Lipids and Lipidoses, Physiol. Rev. 26: 275 (April) 1946.

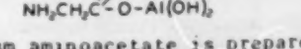
Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

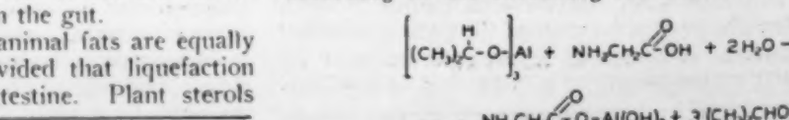
The following additional articles have been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the rules on which the Council bases its action will be sent on application.

AUSTIN SMITH, M.D., *Secretary.*

DIHYDROXY ALUMINUM AMINOACETATE.—Alglyn-Brayten.—A basic aluminum salt of glycine containing small amounts of aluminum hydroxide and glycine.—$C_2H_6O_4NAl$.—M. W. 135.05.—The structural formula for basic aluminum aminoacetate may be represented as follows:



Dihydroxy aluminum aminoacetate is prepared by the reaction of aluminum isopropoxide with glycine according to the following reaction:



The precipitated dihydroxy aluminum aminoacetate is filtered with suction, washed with isopropyl alcohol and dried at a temperature not exceeding 71 C. The aluminum isopropoxide is prepared by the

reaction of aluminum in shreds or strips with anhydrous isopropyl alcohol, catalyzed by 0.03 per cent mercuric chloride, followed by distillation under vacuum.

Actions and Uses.—Dihydroxy aluminum aminoacetate acts as a gastric antacid when taken orally and is thus useful for the control of hyperacidity in the management of peptic ulcer. It shares the properties of the aluminum hydroxide gel preparations, over which it has no important advantages. Its buffer action is not significantly more prompt, great or prolonged than that of the liquid preparations of aluminum hydroxide gel when compared on the basis of equivalent aluminum content. Compared with dried aluminum hydroxide gel (U.S.P.) it possesses only slightly more prompt buffering action and shares with that preparation the convenience of tablet form in which it is used. Because it contains from 50 to 60 per cent less aluminum than the aluminum hydroxide preparations, the formation of astringent aluminum chloride in the intestine is theoretically reduced, which is claimed to result in less constipating action. The clinical significance of its slightly more prompt buffering action than dried aluminum hydroxide gel or its tendency to produce less constipation than aluminum hydroxide preparations in general is open to question. Claims that dihydroxy aluminum aminoacetate is generally superior to aluminium hydroxide preparations are disallowed until more clinical evidence is available to demonstrate significant differences. The claimed prompt disintegration in the stomach of dihydroxy aluminum aminoacetate tablets when swallowed whole appears to offer only limited advantage for the ambulant treatment of persons unable to chew tablet preparations of dried aluminum hydroxide gel, since the latter may be readily broken up prior to administration when that becomes necessary.

Dosage.—Dihydroxy aluminum aminoacetate is administered orally in tablet form. One to two 0.5 Gm. tablets after meals and at bedtime or as otherwise required to control hyperacidity are recommended. As with other internally administered aluminum compounds, constipation may occur from prolonged administration.

Tests and Standards

Dihydroxy aluminum aminoacetate is a white, odorless powder with a faint sweet taste. It is insoluble in water and organic solvents, but soluble in dilute mineral acids and solutions of fixed alkalies to yield a cloudy solution which clarifies on heating.

Dry 2 Gm. of dihydroxy aluminum aminoacetate, accurately weighed, to constant weight at 130 C. This requires two to three day's drying. The loss in weight does not exceed 14.5 per cent.

Prepare a suspension of 1 Gm. of finely ground dihydroxy aluminum aminoacetate in a glass-stoppered flask containing 25 cc. of distilled water. Mix the contents for 5 minutes, and then let stand for 5 minutes. The pH should be 6.5 to 7.5.

Transfer 0.2 Gm. of finely ground dihydroxy aluminum aminoacetate, accurately weighed, to a glass-stoppered flask containing 25 cc. of tenth-normal hydrochloric acid. Agitate the mixture vigorously for 5 minutes, and then let it stand for 5 minutes. The pH must be above 3.0.

To 20 cc. of an aqueous suspension (1 in 25) of dihydroxy aluminum aminoacetate add hydrochloric acid dropwise until the compound just dissolves to form a clear solution. Divide the solution into two equal portions. To one portion add an excess of ammonia T.S.; a white flocculent precipitate of aluminum hydroxide is formed which is insoluble in an excess of ammonia but soluble in sodium hydroxide T.S. To the other portion add one drop of liquified phenol and 5 cc. of sodium hypochlorite T.S.; a blue color is produced, characteristic of aminoacetic acid.

Dihydroxy aluminum aminoacetate shows no heavy metals when subjected to the test outlined in U.S.P. XIII, page 657. Dihydroxy aluminum aminoacetate shall be free of mercury when a solution containing 1 Gm. of the compound dissolved in 10 cc. diluted hydrochloric acid is shaken with 10 cc. of a solution of dithizone in carbon tetrachloride (concentration 2 mg. per 100 cc.): The CCl_4 layer does not turn orange (Feigl, F.: Qualitative Analysis by Spot Tests, ed. 3, New York, Elsevier Pub. Co., 1946, p. 49).

Suspend 5 Gm. of dihydroxy aluminum aminoacetate in 100 cc. of tenth-normal potassium permanganate acidified with 10 cc. of concentrated sulfuric acid. Reflux the mixture for 30 minutes and distil a 10 cc. sample. The distillate must be free from acetone as shown by the nitroprusside test (N.F. VIII, p. 20).

Add 0.25 Gm. finely ground dihydroxy aluminum aminoacetate to 50 cc. tenth-normal hydrochloric acid. Allow to stand 10 minutes with occasional agitation. At the end of 10 minutes back titrate the excess acid with tenth-normal sodium hydroxide to a pH of 3.8 using bromphenol blue T.S. as indicator. One gram of dihydroxy aluminum aminoacetate neutralizes at room temperature not less than 125 cc. and not more than 175 cc. of tenth-normal hydrochloric acid under these conditions.

Transfer about 1 Gm. of dried dihydroxy aluminum aminoacetate, accurately weighed, to a platinum dish. Add 5 cc. nitric acid and 2 cc. of sulfuric acid (1:1). Fume off the acids and ignite in a muffle furnace at 1,200 to 1,500 C. Dissolve the residue in 10 cc. of hydrochloric acid and 5 cc. of sulfuric acid (1:1) and transfer to a 600 cc. beaker. Dilute with water to 400 cc. and add strong ammonia solution until the solution is just basic to methyl red. Heat to boiling, filter and wash the precipitate with hot water until the washings are free from chloride. Dry the precipitate, ignite it at 1,200 - 1,500 C. to constant weight, cool and weigh the Al_2O_3 so obtained. The calculated aluminum oxide content of dry dihydroxy aluminum aminoacetate is not less than 34.9 per cent and not greater than 38.7 per cent.

Determine the nitrogen content by the semi-micro Kjeldahl method (U.S.P. XIII, p. 673), using 0.1 Gm. of dried dihydroxy aluminum aminoacetate, accurately weighed. The per cent of nitrogen present in dry dihydroxy aluminum aminoacetate is not less than 9.8 or greater than 10.8 per cent.

BRAYTEN PHARMACEUTICAL CO., CHATTANOOGA, TENN.

Alglyn *(Powder)*: bulk

Tablets Alglyn: 0.5 Gm.

U. S. Trademark 420,509.

DIETHYLSTILBESTROL—U.S.P. (See New and Nonofficial Remedies 1947, p. 347)

The following dosage form has been accepted:

KREMERS-URBAN CO., MILWAUKEE

Tablets Diethystilbestrol: 1 mg. and 5 mg.

DIPHENYLHYDANTOIN SODIUM—U.S.P. (See New and Nonofficial Remedies 1947, p. 400).

The following dosage form has been accepted:

AMERICAN PHARMACEUTICAL CO., INC., NEW YORK

Capsules Diphenylhydantoin Sodium: 0.1 Gm.

PENICILLIN (See New and Nonofficial Remedies 1947, p. 144).

The following dosage forms have been accepted:

BIO-RAMO DRUG CO., BALTIMORE

Penicillin Sodium: 200,000 and 500,000 unit vials.

COMMERCIAL SOLVENTS CORPORATION, NEW YORK

Soluble Tablets Crystalline Penicillin G Potassium: 50,000 units.

SODIUM ASCORBATE INJECTION—U.S.P. (See New and Nonofficial Remedies 1947, p. 520).

The following dosage forms have been accepted:

LINCOLN LABORATORIES, INC., DECATUR, ILL.

Solution Sodium Ascorbate: 100 mg. per cc., 2 cc. and 5 cc. ampuls.

THE WILLIAM S. MERRELL CO., CINCINNATI

Solution Sodium Ascorbate: 100 mg. and 500 mg. per cc., 2 cc. ampuls.

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SATURDAY, JULY 31, 1948

EDITORIAL ANNOUNCEMENT

The compositors returned to work on Monday, June 28. This issue of The Journal has been prepared in part by the use of Vari-Typer machines.

EXPERIMENTAL NECROTIZING ARTERITIS

Summarizing several years of experimental work, Holman[1] and his associates of the Department of Pathology, University of North Carolina, concluded that degenerative lesions affecting principally the aorta, pulmonary artery, auricular endocardium and coronary arteries may be produced with regularity in young dogs by controlling two factors: (*a*) diet and (*b*) renal efficiency. Both factors are necessary, either one in itself being ineffective.

Two diets were used in these experiments. The first or "standard diet" consisted of 32 parts of calves' liver, 25 parts of cane sugar, 25 parts of corn starch, 12 parts of butter and 6 parts of commercial cod liver oil plus enough tomato juice to make a paste. Each gram of this diet contained 3 calories. The diet was fed in amounts to furnish 75 calories per kilogram per dog daily. Five grams of kaolin and 1 mg. of salt mixture were added to each daily feeding. The second or "kennel diet" consisted of selected table scraps reinforced by the addition of 6 per cent commercial cod liver oil.

After feeding of one of these diets for eight to twelve weeks renal injury was produced by one of several methods, usually by a minimum lethal dose of uranyl nitrate injected subcutaneously or by mercury chloride injected intravenously. Bilateral nephrectomy was used in a few cases. The animals died of uremia or were killed seven to thirty-five days after the renal injury.

In 87 per cent of the 55 dogs thus far tested arterial lesions were found. These varied from (±) equivocal lesions discovered only in microscopic sections to (+++) gross necrotizing lesions 1 cm. in maximum diameter. The first detectable anatomic change is edema, swelling, fragmentation and necrosis of collagen. The subsequent fibrin and leukocytic reactions were presumably secondary responses.

Evidently there are one or more anticollagens in the selected diets which are neutralized or eliminated by normal renal function. Substitution of corn oil for cod liver oil in either diet renders the diet nontoxic. That the toxic factor is not unique to cod liver oil, however, is deduced from the fact that similar necrotizing arteritis is occasionally noted in nephrectomized dogs in which beef fat is substituted for cod liver oil. The evidence thus suggests that the toxic factor responsible for the necrotizing arterial lesion is a lipid.

If so, the question naturally arise as to the possible effect of vitamin E, a "fat antioxidant" on the production of the arterial lesions.[2] To test this, a capsule containing 20 mg. of mixed natural tocopherols was given daily by mouth, from two days before to two days after the renal injury The dogs thus treated survived for eight to thirty days after the renal injury. At necropsy arterial lesions were not noted. The conclusion is drawn that oral administration of adequate doses of vitamin E is a preventive of experimental necrotizing arteritis in dogs, due to a combination of toxic lipids and reduced renal function.

Acute necrotizing arteritis in dogs has a close human counterpart in periarteritis nodosa and rheumatic arteritis in man

RADIOACTIVE LOCALIZATION OF BRAIN TUMORS

In 1947 Moore of the Department of Surgery, University of Minnesota, found that fluorescein injected intravenously into patients has the property of elective localization in malignant tissues.

Five cubic centimeters of a 20 per cent sodium fluorescein solution was injected intravenously from three to eight hours before a planned laparotomy for gastric carcinoma At the operation the suspected lesions were inspected with an ultraviolet lamp. Differences between normal and malignant tissues were then noted, the malignant tissues fluorescing with a vivid yellow color. The main exceptions were in cases in which the malignant tissues were situated more than a few millimeters below the surface. In these cases, little or no fluorescence was noted, presumably because ultraviolet light can penetrate only a few millimeters through surrounding tissues. In 11 of 17 cases of of malignant tumors of the gastrointestinal tract a high grade fluorescence was associated with verified diagnoses of malignancy by microscopic methods. Three cases showed only slight fluorescence. In an additional 3 cases malignant tumors or tumor fragments failed to fluoresce, the majority of the partial or complete failures occurring in bulky tumors. Necrotic tissues did not fluoresce. Edema and cyst formation at times accounted for erroneous tests.

More reliable results were obtained with brain tumors. Twelve patients suspected of having intracranial neoplasms were examined. Tissues were

1. Holman, R. L., and Swanton, M. C.: Proc. Soc. Exper. Biol. and Med. **63**: 87 (Oct.) 1946.

2. Holman, R. L.: Proc. Soc. Exper. Biol. and Med. **66**: 307 (Nov.) 1947.

1. Moore, G. E.: Science, **106**: 130, 1947.

obtained from suspected areas by aspiration needle. Exaggerated fluorescence was observed under ultraviolet light. There was a perfect correlation between results by this technic and subsequent diagnosis by standard pathologic methods.

In an attempt to extend the clinical usefulness of this technic,[2] a radioactive derivative of fluorescein (sodium diiodofluorescein) was synthesized with I^{131}. The amount of I^{131} added was adjusted to give 1 millicurie of radioactivity per 10 cc. of a 2 per cent solution of the fluorescent dye. An amount of dye calculated to give 500-600 microcuries of radioactivity was injected intravenously into 12 patients with suspected brain tumors. From two to four hours later radioactive tests were made with a specially screened Geiger-Müller tube. Background radiation was eliminated by a 2 cm.-thick lead shield provided with a lead cone to reduce the area exposed. Thin lead foil was placed over the counter window to filter out beta radiation. Counts were taken for three to five minute intervals at each of several positions on the skull with the cone of the detection unit directly on the skin. A majority of the tests were carried out without knowledge of the neurologic findings, roentgen examination or staff opinion. A definite area was outlined on the skull over the apparent site of the radioactive tissues.

In all cases this outline coincided closely with the extent of the superficially situated meningeoma subsequently found at operation. Correct positive and negative findings were noted. In 3 cases the preoperative clinical diagnosis was proved wrong. In one negative radioactive test no tumor but an aneurysm of the right internal carotid was found on operation. In a second case the preoperative diagnosis of subdura hematoma was changed to that of tumor by the radioactive test. The radioactive diagnosis was in all cases confirmed by the subsequent operation.

Preliminary experiments utilizing induced brain tumors in mice have revealed a concentration of the radioactive dye in tumor tissues as high as eighty times that found in the adjacent normal tissues. A possible therapeutic use of the radioactive dye has not yet been considered.

2. Moore, G. E.: Science, 107: 569, 1948.

Current Comment

METABOLIC FATE OF THYROXIN

The development of highly sensitive technics for the estimation of radioactive isotopes has made possible the study of the metabolic fate of active drugs such as thyroxin. When this hormone, labeled with radioactive iodine, is injected into rats, more than 50 per cent of the administered dose may be recovered after two hours in the gastrointestinal tract, liver and pancreas, mainly in unaltered form.[1] Two days after the injection, about 80 per cent may be recovered from the feces, largely unchanged, while some 11 per cent is present as inorganic iodide in the urine. The liver, kidneys, adrenals, ovaries and lymphatic organs tend to maintain their radioactivity at this time. The thyroxin appears to enter the intestinal tract by way of the liver, the organ active in the excretion of certain other halogenated compounds. The results are interesting especially because they form a possible experimental basis for any relationships which may exist between thyroid and hepatic function. They were obtained with relatively large doses of thyroxin (about a milligram); preliminary work with physiologic amounts indicates a similar trend with respect to distribution.

1. Gross, J., and LeBlond, C.P.: J. Biol. Chem. 171: 309, 1947.

REFLECTIONS ON GENIUS

W. R. Brain,[1] in a review of current thinking on the mental factors which tend toward genius, considers intelligence the most important and the one distinguishing feature in families in which great ability is transmitted through successive generations. The definition of genius as proposed by Kretschmer is quoted:

> We shall give the name genius to those men who are able to arouse permanently, and in the highest degree, that positive, scientifically grounded feeling of worth and value in a wide group of human beings. But we shall only do so in those cases where the value arises with psychological necessity, out of the special mental structure of the bringer of value, not where a stroke of luck or some coincidence of factors has thrown it in his lap.

Another factor of importance is the physiologic organization of nerve cells into functional patterns called "schemas." The genius presumably excels the ordinary person in that he is richer in the numbers and patterns of his physiologic "schemes." The relationship between intelligence and the use of words is important, as high levels of conceptual thought are possible only with a highly developed capacity for verbal symbolization. Dr. Johnson, Coleridge and Shelley are examples of association of prodigious memory with genius. Most remarkable feature of the creations of genius is considered to be the extent to which thought arises apparently independently of the conscious mind, usually accompanied by a high degree of emotional excitement. The person so affected is often endowed with a continuous unrelenting energy for work until the task is fulfilled. Poincaré illustrates inspiration in discussing a mathematical discovery:

> One is at once struck by these appearances of sudden illumination, obvious indications of a long course of previous unconscious work.... This unconscious work...is not possible, or in any case not fruitful, unless it is first preceded and then followed by a period of conscious work. These sudden inspirations are never produced...except after some days of voluntary efforts which appeared absolutely fruitless, in which one thought one had accomplished nothing, and seemed to be on a totally

1. Brain W.R.: Some Reflections on Genius, Lancet 1:661-665 (May 1) 1948.

wrong track. These efforts, however, were not as barren as one thought; they set the unconscious machine in motion, and without them it would not have worked at all, and would not have produced anything. The necessity for the second period of conscious work can be even more readily understood. It is necessary to work out the result of inspiration, to deduce the immediate consequences and put them in order, and to set out the demonstrations, but, above all, it is necessary to verify them.

Goethe states that "No productiveness of the highest kind, no remarkable discovery, no great thought that bears fruit and has results is in the power of any one; such things are above earthly control." Poetic genius, administrative genius, musical genius and genius in its relation to mental disorder are discussed. The creative genius, whether he be artist, scientist or abstract thinker, is in all cases considered to be inspired in the same way, differing only in that his unconscious and conscious application is directed to other subject matter. Discussing mental disorder and neuroticism as compared to the quality of genius, the author concludes that the nervous traits in the genius are genetically and psychogenetically identical with those which we term neurotic in the ordinary man.

ICTERUS OF THE NEWBORN

Apparently the largest potential source of iron for new blood formation in the infant[1] is the destruction of erythrocytes in the early days after birth. The concentration of serum bilirubin, which is approximately 1 mg. per hundred cubic centimeters at birth, commonly rises by the fifth day to about 5 mg., a level at which jaundice is usually apparent in most infants. This rise has been attributed[2] to the hemolytic action of an increased level of blood lipid brought about by a sudden increase in dietary fat after birth (the placenta is impermeable to fat). High fat diets induce accelerated destruction of red blood cells and production of biliary pigment, demonstrated in experimental animals.[3] When the child's formula is limited to 0.03 per cent fat in place of the usual 3.6 per cent, the rise in serum bilirubin is much less. Thus a considerable part of the hyperbilirubinemia in the newborn can be controlled by a reduction in the proportion of calories obtained from the dietary fat.

STATISTICAL STUDIES OF HEART DISEASES

Moriyama and Gover [1] note that the most important infectious diseases have given way to the chronic degenerative diseases as the chief causes of mortality. Thus the death rate for tuberculosis in 1945 was only 21 per cent of the rate in 1900, and the average pneumonia rate of 49 per 100,000 population, in the five year period 1941 to 1945 contrasts markedly with the average of 161 per 100,000 population in the years 1900 to 1904. During this period of extraordinary advances in the public health the death rate for heart diseases climbed steadily. In the forty-five years since 1900, the death rate for heart disease increased from 137 to 322 per 100,000 population, while the death rate for all causes dropped from 1,719 to 1,062 per 100,000 population in the United States death registration states. These trends of mortality have been described in terms of crude and annual death rates. The aging of the population in the United States is an important factor in the upward trend of the death rate for heart disease. This tendency has been reinforced by the decline in the birth rate and the curtailment of immigration. During the period from 1900 to 1940, the median age of the population of the United States increased from 22.9 to 29.0 years. The age distribution of total deaths has changed in a pronounced manner, reflecting in part the change that has taken place in the age distribution of the living population. In 1880, 40 per cent of the recorded deaths were of persons under 5 years of age, while 14 per cent were 65 years of age and over; in 1940 only 10 per cent of deaths were of persons under 5 years of age, while 46 per cent were 65 years of age or older. Practically half the deaths occurring at the present time are among persons in the definitely older age brackets. The effect of these changes in the age composition of the population on the death rates can be eliminated by computing age-adjusted death rates. The tendency for the chronic and degenerative diseases of middle and old age to replace the infectious diseases as leading causes of death is not essentially altered when the changing age distribution is taken into account. Heart disease has progressed in the forty year interval from third to first place, nephritis from seventh to fourth, cancer from eighth to second and diabetes from eighteenth to eighth place, while tuberculosis, pneumonia, diarrhea and enteritis, diphtheria and other communicable diseases have declined from higher to lower ranks. Since the upward trend is evident even in age-adjusted rates for some of the diseases characteristic of middle and old age, the aging of the population could not be wholly responsible. The decline in the mortality rates for infectious diseases including tuberculosis and pneumonia has been so rapid that, despite the increase in mortality for the old age diseases taken as a group, there has been a downward trend in the crude death rate for all causes involved. The authors estimate, on the basis of a crude general death rate of about 14 per 1,000 population in 1980, that deaths from heart disease will constitute roughly 32 per cent of all deaths occurring in that year. Trends of mortality from syphilis, from acute rheumatic fever, and other infections which may lead to specific heart conditions, are definitely downward. With respect to the larger group of degenerative heart diseases, much can be done at present to postpone the onset of cases and to slow their progress. Heart disease, the authors believe, will probably continue to play the principal role in the upward trend of mortality unless some revolutionary advance is made bearing on the prevention and treatment of cardiac diseases.

1. Stearns, G., and McKinley, J.B.: J. Nutrition 13: 143, 1937.
2. Loewy, A., and Freeman, L.W.: Am. J. Physiol. 157: 205, 1948.
3. Loewy, A.; Freeman, L.W.; Marchello, A., and Johnson, V.: Am. J. Physiol. 138: 230, 1943.

1. Moriyama, I. M., and Gover, M.: Statistical Studies of Heart Diseases. Pub. Health Rep. **63**: 537-545.

ORGANIZATION SECTION

Association News

RED CROSS BLOOD PROGRAM

The American Red Cross has sent to the American Medical Association its interpretation of its action of the House of Delegates June 23, 1948 regarding American Red Cross Blood Program. The statement which follows has been referred to the special committee established to confer with the American Red Cross on this subject:

The House of Delegates approved the recommendation of its reference committee that there be no change in the "approval in principle" of the National Blood Program of the American Red Cross. The referencce committee expressed its opinion as to how "approval in principle" be construed. The American Red Cross is in substantial agreement with that opinion and with reference thereto makes the following specific observations.

It was the opinion of the reference committee that "local control must be by the county medical society." This is in accordance with existing Red Cross policy. In fact, the Red Cross has gone beyond this and has laid special emphasis on the methods whereby the local medical society may secure complete control of the technical program.

The reference committee also thought that "the local medical society should be the contact in the initial contemplation of inauguration of a new blood bank." This is likewise in accordance with Red Cross policy which clearly states that the local medical societies, hospital organizations and public health authorities must be in complete accord with the establishment of a blood center before any action is taken. The Red Cross has, in fact, gone beyond this by making certain that the medical societies in surrounding counties are consulted and are in complete accord before any attempt is made to establish a regional center.

The House of Delegates approved the recommendation of its referencce committee that the American Medical Association committee which has been considering blood banks "be enlarged to nine members with definite instructions to meet at stated intervals at the call of either the chairman of its committee or that of the Red Cross." The Red Cross has worked with this American Medical Association committee with results satisfactory to both organizations. It stands ready to join with the American Medical Association in even greater effort and cooperation to attain objectives satisfactory to each.

The reference committee objected to the use of the term "free blood" in the publicity of the American Red Cross. It has not been the practice of American Red Cross to use the words "free blood" in publicity regarding the National Blood Program. However, it must be generally and clearly understood that blood and blood derivatives are made available by the Red Cross to physicians and hospitals without cost to them. While it is expected that they will collect from the recipient expenses incident to the administration of that blood, they will not collect from him payment for material for which they have paid nothing to the Red Cross.

It is unthinkable that the Red Cross should sell to physicians and hospitals the blood and blood derivatives that are the result of donations freely given it for the alleviation of distress and suffering of persons who need that blood or the substances which come from it. It is equally unthinkable that physicians and hospitals should sell to recipients that which they have received from the Red Cross without cost to them. There would be no Red Cross blood donors and no Red Cross blood program if those who were asked to give their blood were informed that the blood which they had given or the substances which came from it were to be sold to physicians and hospitals who in turn would sell these products to the persons whose lives would be in jeopardy without them.

Washington Letter

(From Our Regular Correspondent)

July 28, 1948.

Critique of Brookings Health Report Published

The Senate Committee on Labor and Public Welfare has begun distribution of a seventeen page critique of the Brookings Institution report, published earlier this year and entitled "The Issue of Compulsory Health Insurance." Prepared by Michael M. Davis, chairman of the Committee on Research in Medical Economics, and Dewey Anderson, executive director of Public Affairs Institute, the analysis was printed and is being distributed by the Senate committee at the behest of two of its members who are proponents of national health insurance, Senators James E. Murray and Claude Pepper. Main points of the Davis-Anderson review are summarized as follows: (1) The Brookings report does not present evidence justifying its condemnation of compulsory health insurance, nor does it recognize "that most of the difficulties alleged against compulsory health insurance are faced and must be solved by voluntary plans also"; (2) it does not face squarely the problem of unpredictable sickness costs; (3) the Brookings conclusion that the public should depend on voluntary health insurance does not explain how obstructions to enrollment of great masses of population in such plans are to be eliminated; (4) advocacy of the "means test," by which persons unable to pay dues in voluntary plans would receive charity, tax-supported medical care, is denounced as "neither politically valid nor decently human"; (5) finally, according to Davis and Anderson, "The Issue of Compulsory Health Insurance" (written by George W. Bachman and Lewis Meriam) begs the question by devoting considerable space to mortality and morbidity statistics which have little or no bearing on the issue of health insurance. It is understood that only three hundred copies of the Davis-Anderson review have been printed by the Senate committee, but the authors' respective organizations will issue their own printings. The Senate's limited edition bears on its cover a notice: "opinions expressed herein should in no way be construed as representing the official views of either the Subcommittee on Health or the Senate Committee on Labor and Public Welfare."

First Inter-American Conference for Rehabilitation of Cripples

Michael J. Shortley, director of the Office of Vocational Rehabilitation, Federal Security Agency, served as chairman of the United States delegation to the First Inter-American Conference for Rehabilitation of Cripples, held in Mexico City July 18-24. Other members of the official group, appointed by the State Department, included Dr. Henry H. Kessler, representing the National Council on Rehabilitation; Col. Harold B. Luscombe, chief of physical medicine at William Beaumont General Hospital; Comdr. Thomas J. Canty, Mare Island (Calif.) Naval Hospital, and Lieut. Col. Benjamin A. Strickland Jr., chief of the physical medicine consultants' division in the Army Surgeon General's Office.

Shellfish Bacteriology Laboratory Established

U. S. Public Health Service has announced establishment at the Woods Hole (Mass.) Oceanographic Institution of a laboratory for investigations of shellfish bacteriology. One of its first projects will be a comparative study of organisms, such ascoliform bacteria, which have been used to ascertain pollution of shellfish-growing waters. Reevaluation of technical information on which sanitary standards are based will be one of the laboratory's duties. Studies will be undertaken, under controlled conditions, on the common varieties of edible shellfish: oysters, hard and soft clams and mussels.

GOVERNMENT SERVICES

ARMY

PHARMACY RESERVE UNIT

A Pharmacy Reserve Officers Training Corps unit will be in operation this fall at the University of Minnesota under the direction of Major Leonard P. Zagelow of the U. S. Army. Any man between 18 and 27 years of age who can meet college requirements is eligible to enter the new program. Each student is required to spend one hour per week in military instruction, in addition to the regular pharmacy credits for the four years and to attend an army camp for six weeks between his junior and senior years. At the completion of the program he is awarded a commission in the Reserve Officers Corps, and during his junior and senior years ,receives compensation amounting to about $24 a month.

LECTURES AT INSTITUTE OF PATHOLOGY

Dr. Hartwig Kuhlinbeck, Woman's Medical College, Philadelphia, lectured on "Nephrogenic Adenoma of the Urinary Bladder" on June 23. On June 24, Dr. Henry Pinkerton, St. Louis University School of Medicine, lectured on "Experimental Work on Cancer with Particular Reference to Chemotherapy." On June 25, Dr. Herman Becks, the Hooper Foundation, University of California, lectured on "Nutritional Studies in Development of the Mandible and Maxilla."

PERSONALS

Lieut. Col. Helen C. Burns, the first woman to receive an Army commission as a dietitian, has retired from the Army after twenty years of service. Colonel Burns was Director of Dietitians in the Surgeon General's Office during the recent war.

Mr. Joseph A. Groesbeck, chief of the library's acquisition division, left on a two month mission to Japan on July 6, to acquire Japanese medical literature lacking in the library's collections and to reopen exchange relationships with Japanese institutions.

BODY WEIGHT AND MAXIMUM STATURE

The Quartermaster Corps has completed an anthropometric survey of Army men and women to determine the average weight and measurements for different groups. The purpose was to obtain data with which to revise the range of clothing sizes issued and to prepare for the induction of young men under the new draft law. Studies were made of more than 17,000 men between 17 and 26 years of age, some of whom were being inducted into the service and others being discharged from the service. The average mean stature of the 17-year-olds was 67.71 inches (172 cm.) and the average weight 139.5 pounds (63.3 Kg.). After one or two years of service in the Army, these averages increased. The mean maximum stature of 68.51 inches (174 cm.) was attained at the age of 21; however, after the age of 19 years the average increase was only 0.1 inch (0.25 cm.). The chest circumference for the 17-year-olds averaged 34.5 inches (87.6 cm.) and for the 26-year-olds 36.76 inches (93.4 cm.). The neck, judging from these measurements, appears to stabilize in the twenty-fourth year. Of the extremities, the only one which showed any increase after 17 years of age was in the breadth of the hands, which showed an average increase of 2 per cent between 19 and 22 years of age.

The Quartermaster data for the 17-year-olds were compared with similar data obtained by the Brush Foundation over a ten year period at Western Reserve University, Cleveland. The first period of the Brush Foundation studies covered less than a thousand persons representing the economic group for which the average stature at age 17 was 69.48 inches (176.5 cm.) and the mean average weight 147.5 pounds (66.9 Kg.). Since the Army series at age 19, after one or two years of service, show a mean weight averaging about that of the Brush series, the Quartermaster Corps concludes that military diet and environment are beneficial to the group. The study indicates also that the general population is capable of attaining at least as much weight as the "well born" persons, providing it is given the opportunity.

NAVY

RESERVE OFFICERS NEEDED FOR TRAINING DUTY

Naval Reserve medical officers are needed for fourteen day training duty at stations of the Naval Air Reserve Training Command of the Fourth Naval District Headquarters in Philadelphia. Interested reserve officers on inactive duty may obtain information from the office of the Commandant, Fourth Naval District, Naval Base, Philadelphia 12, Pa.

OFFICERS APPROVED FOR POST-GRADUATE TRAINING

The Advisory Board of the Bureau of Medicine and Surgery recently approved the following officers for postgradaute training:

Comdr. Harold L. Baxter (MC), U.S.N., Fellowship in Neurology, Jefferson Medical School, Philadelphia.

Comdr. George L. Calvy (MC), U.S.N., Teaching Fellowship in Preventive Medicine Division, Western Reserve University School of Medicine.

Comdr. Karl V. Kaess (MC), U.S.N., Residency in Dermatology and Syphilology, Naval Hospital, Philadelphia.

Comdr. Edward W. Pinkham (MC), U.S.N., Residency in Surgery, Naval Hospital, Philadelphia.

Comdr. Robert S. Poos (MC), U.S.N., course of instruction in preventive medicine, University of California.

Lieut. Comdr. Wilbur S. Lummis Jr., (MC), U.S.N., Residency in Internal Medicine, Northwestern University and Passavent Hospital, Chicago.

Lieut. Comdr. Leo S. Madlen (MCR), U.S.N.R., Residency in Internal Medicine, Naval Hospital, San Diego, Calif.

Lieut. Comdr. George S. Watkins (MC), U.S.N., course in preventive medicine, Johns Hopkins University.

Lieut. George C. Beattie (MC), U.S.N., Fellowship in Adult Orthopedics, Lahey Clinic, Boston.

Lieut. Boyd K. Black (MC), U.S.N., Fellowship in Pathology, Washington University, St. Louis.

Lieut. John H. Cheffey (MC), U.S.N., to continue course in children's orthopedics at the Alfred I. DuPont Institute, Wilmington, Del.

Lieut. Charles B. Newton (MC), U.S.N., Residency in Internal Medicine, Naval Hospital, Chelsea, Mass.

Lieut. (jg) Thomas C. Deas (MC), U.S.N., Residency in Anesthesiology, University Hospital, Augusta, Ga.

Lieut. (jg) Robert J. Fleischaker (MC), U.S.N., Residency in Surgery at a Naval hospital.

Lieut. (jg) Dean W. Hales (MCR), U.S.N.R., course in otolaryngology, Graduate School of Medicine, College of Medical Evangelists, Los Angeles.

Lieut. (jg) Alan D. Watson (MC), U.S.N., Residency in Dermatology and Syphilology, Naval Hospital, St. Albans, L. I., N. Y.

THE END OF AN OLD NAVY HOSPITAL

The one hundred and ten year old Brooklyn Naval Hospital with its thirty-seven buildings ceased to be a hospital June 30. The old plant will be known henceforth as the "United States Naval Receiving Station Annex, Brooklyn." The patients were transferred to the Navy's more modern hospitals. During the recent war, the hospital cared for 65,197 Navy men and women and their dependents. At the opening of the Civil War, this hospital had only two medical officers on its staff, while during World War II there were 107 medical officers, 170 nurses and 400 Medical Corps men on its staff.

REQUEST OFFICER BE ALLOWED TO REMAIN AT GUAM HOSPITAL

The Secretary of the Navy has received a petition from the people of Guam requesting that Capt. H. C. Oard (MC) be allowed to remain "with us" as medical officer in command at the Guam Memorial Hospital for at least one year. The petition unanimously adopted at a joint session of the Guam Congress June 5 and signed by E. T. Calve, Speaker of the House of Assembly and B. J. Bordallo, President of the House of Council, read in part as follows: "Captain Oard has the unqualified confidence, support and friendship of the Guamanian people and it is earnestly requested that he be allowed to remain with us so that the completion of his work may result in great benefit to all."

NEW REGULAR OFFICERS

The following graduates of the Navy's V-12 program have accepted appointments in the medical corps of the regular Navy: Lieutenants (jg) Samuel A. Heaton, Augusta, Ga.; Walter G. Leonard, Norton, Mass.; Harold T. Meryman, Dublin, N. H.; William M. Strunk, Mifflinsburg, Pa.; John S. Walker, Brevard, N. C., and Ernest F. Wallner Jr., Wauwatosa, Wis.

FLIGHT SURGEONS

The Naval School of Aviation Medicine at Pensacola, Fla., on June 18 graduated and designated as flight surgeons the following officers. The principal speaker at the ceremony was Capt. William Sinton, Commanding Officer of the Naval Air Station.

Raymond J. Adams, Lewiston, Idaho
Jack W. Barrett, Miami, Fla.
Robert L. Bauer, Chester, Pa.
Robert L. Burdick, Maple Springs, N. Y.
C. Walter Coolidge, Savannah, Ga.
Henry D. Crane Jr., Belmont, Mass.
Carroll M. Elmore, Rupert, Idaho
Beverly O. Evans, Helena, Ark.
George M. Ewing, Brookfield, Mo.
Edward C. Gresham, Hampton, Ark.
Robert D. Hunt, Endicott, N. Y.
Alvin C. Jensen, Mt. Pleasant, Utah
Edward V. Johnston, Wilmette, Ill.
Frank F. Kalchuk, Hempstead Gardens, L. I., N. Y.
Leon M. Kruger, Norfolk, Va.
Richard E. Luehrs, Merrill, Ore.
Dennis P. McCarty, Delaplane, Va.
Charles C. Muehe, Chicago
Charles Pierson, Nutley, N. J.
Lockland V. Tyler Jr., Jacksonville, Fla.

PUBLIC HEALTH SERVICE

SURVEY OF SANITATION

A survey of the sanitation needs of the United States recently made by the United States Public Health Service is now available in printed form. This survey, the Federal Security Agency reports, is the first attempt on a national scale to evaluate the needs of this country for sanitation facilities on the basis of actual field investigation. According to the report, more than 6,000,000 persons in towns and cities need new sewerage systems, while 79,000,000 others need improvements to sewerage systems. More than 2,000,000 persons, it is stated, living in communities of 200 or more persons, have no community water supply systems, and 79,000,000 persons have systems that need improvements. The total cost of needed water supply and waste disposal facilities was estimated at $7,834,581,000. More than 27,000,000 persons in rural areas need new or improved water supply, and more than 33,000,000 in such areas have unsatisfactory sewage disposal systems. To remedy this condition, the report states, the nation needs an additional 2.2 billion dollars' worth of water works; 3.7 billion dollars of sewerage facilities; 166 million dollars of garbage facilities, and 1.6 billion dollars of all types of sanitation facilities for rural homes.

Copies of the survey report may be purchased at 15 cents each from the Superintendent of Documents, Washington, D. C.

EMERGENCY PLANNING UNIT

The Federal Security Administrator announces the establishment of a Health Emergency Planning unit in the U. S. Public Service under the direction of Dr. Norvin C. Kiefer. The new unit will draw plans for more comprehensive public health catastrophe services to be offered in response to peacetime emergency requests from states. The unit will co-operate with the National Security Resources Board, the Office of Civil Defense Planning of the National Military Establishment, the Military Services, and State Health Department, as well as professional and voluntary organizations, to plan a coordinated program for safeguarding public health during a national emergency.

DR. MEADER APPOINTED DEPUTY CHIEF

The Director of the National Cancer Institute announces the appointment of Dr. R. G. Meader as Deputy Chief of the Cancer Research Grants Branch of the Institute. He will be responsible for scientific reviews of applications for cancer grants, for maintaining contact with investigators in the field and for analyzing the grant-in-aid program of the Institute in relation to programs of other agencies supporting research in cancer. Dr. Meader received a Ph.D. degree at Yale University. He was formerly assistant professor in biology and in anatomy and a lecturer in anatomy at Yale.

MISCELLANEOUS

ROTATING INTERN AND PSYCHIATRIC RESIDENCE

The U. S. Civil Service Commission will conduct an examination for filling medical officer positions in St. Elizabeth's Hospital, Washington, D. C. Medical officers (rotating intern) are paid $2,200 for the first year and $2,400 for the second year. Medical officers (psychiatric resident) are paid from $2,400 to $4,100 a year, depending on the amount of approved graduate training that the applicant has completed. Appointments are open for July 1, 1949. To qualify for internship, applicants must be third or fourth year students in an approved medical school; however, they may not enter on duty until they have completed their full course of study. Applicants for psychiatric residency must be graduates of an approved medical school and in addition must have completed an approved internship or now be serving such an internship. No written test is required for these positions. Application forms may be obtained from the U. S. Civil Service Commission, Washington, D. C., from post offices and from Civil Service regional offices.

AWARDS AND COMMENDATIONS

Dr. George G. Deaver

The President of the United States has awarded the Medal for Merit to Dr. George G. Deaver, Professor of Clinical Rehabilitation and Physical Medicine at New York University College of Medicine. The citation read in part as follows: Dr. Deaver, a pioneer and researcher in the field of rehabilitation undertook a training program for the Army Air Forces in October, 1943, giving unstintingly of his time in teaching his techniques of restoration and rehabilitation. He served as Consultant to The Air Surgeon, as well as consulting with the Army, Navy, and Veterans Administration in the field of rehabilitation, and aid them not only with individual patients, but also in setting policy for their over-all programs. As a result of these contributions, many lives were saved, suffering was diminished and countless men were returned to duty or productive places in civilian life.

PHYSICIANS SEPARATED FROM SERVICE

ARMY MEDICAL CORPS OFFICERS RECOMMENDED FOR/OR RELIEVED FROM ACTIVE DUTY

Alabama

Carmichael, Herbert N.....Fairfield
Colley, Jesse H.....Troy
Latham, John T.....New Market
Reid, Joel W.....Montgomery

Arkansas

Ashley, Milton M.....Swifton
Christeson, William W.....Harrison
Henley, Paul G.....Prescott

California

Black, James E. Jr.....San Francisco
Bowen, Gordon T.....Los Angeles
Brockman, Norman W.....Los Angeles
Dimick, Max L.....San Francisco
Doherty, Edward W.....San Francisco
Fleming, William J.....San Francisco
Freytag, Knox R.....Oakland
Gould, Russell L.....San Francisco
Hamilton, Charles I. Jr.....Placerville
Jackson, Lionel L.....San Francisco
Neerken, Adrian J.....West Los Angeles
Newbold, Milton W.....Los Angeles
Noyes, Robert W.....Oakland
Parsons, Harry G. Jr.....Oakland
Ringer, Norman E.....Lone
Stevenson, Thomas C.....Menlo Park
Tyrer, Austin R. Jr.....Los Angeles
Von Amerongen, F. K. North Hollywood

Colorado

McCallum, Marion J.....Denver
Maxwell, Ned G.....Denver
Millett, William D.....Denver

Connecticut

Bennett, Ivan F.....Hartford
Berman, Sidney.....New Haven
May, Samuel C.....Hamden
Zucker, Reuben.....Waterbury

Illinois

Auten, Donald S.....Oak Park
Clarke, James S.....La Grange
Eisele, Mathew B.....East St. Louis
Farrell, Leonard F.....Chicago
Fleming, Joseph L.....Chicago
Garland, Donald J. .....Chicago
Gluckman, Robert M.....Chicago
Long, Burt E.....Chicago
Maryland, Thomas J.....Chicago
Morton, Douglas R.....Zion
Moy, Grant G.....Chicago
Neilson, William G.....Roseville
Plunkett, John P.....Chicago
Tarun, Donald W.....Chicago
Tenenbaum, Maurice.....Chicago

Kansas

Blaylock, Hoyt C.....Newton
Hartford, John J.....Lenox
Marchbanks, Howard E.....Kansas City

Maine

Osher, William J.....Biddeford
Rheinlander, Harold F.....Washburn
Robertson, Robert B.....Presque Isle

Massachusetts

Boyle, Jeremiah J. Jr.....Cambridge
Fontneau, Nelson C. Jr.....Somerville
Harris, Edmund J.....Waltham
Kurland, George S.....Dorchester
Maddix, Forrest N. Jr.....Brookline
Miller, Paul R.....Brookline
Pfeffer, William Jr.....Brookline
Porter, Huntington.....Cambridge
Simmons, Harold L. Jr.....Boston
Steinsieck, Robert T.....Newton Centre

Minnesota

Henderson, Edward D.....Minneapolis
Howard, Robert B.....Minneapolis
Koza, Donald W.....Minneapolis
Kraft, Joseph R.....Winona
Miners, George W.....South Minneapolis
Schleper, Albin J.....Cold Springs
Shaffer, John O.....Minneapolis
Spicer, Frank W. Jr.....Duluth
Tillotson, Irving G.....St. Paul

New Jersey

Blodgett, William A.....Watertown
Coombs, Harrison S.....Ridgewood
Cox, John J. Jr.....Camden
Gherardi, Gherardo J.....Trenton
Goodman, Harry P.....Margate
Jacobson, Avrohm.....Lakewood
Ruby, Victor M.....Atlantic City
Schultz, Sidney.....Jersey City
Sheldon, Murray B. Jr.....Keansburg
Stockman, John C.....Andover

New York

Anderson, Frederick W.....Oxford
Barbaccia, Anthony J.....Bronx
Barstow, Robert O.....Albany
Bauman, Kenneth L.....Rochester
Carl, Gary H.....Williamsville
Casolaro, Joseph D.....Brooklyn
Clark, Frederick B.....Pittsford
Cohn, Jay B.....New York
Colombo, Thomas M.....Brooklyn
Finkelstein, Paul.....Brooklyn
French, Leo H. Jr.....Olean
Freundlich, Eugene.....New York
Lane, Nathan Jr.....New York
Lautz, Herbert A.....Lockport
Levine, Ervan L.....Suffern
Love, Vincent L.....Syracuse
Papper, Solomon.....New York
Pellegrino, Edmund D.....Brooklyn
Pierce, Jack R.....Buffalo
Potekhen, George P.....New York
Prisco, Armand J.....New York
Romeo, Anthony L.....Perrysburg
Ruggieri, Bartholomew A.....New York
Sachs, Bernard A.....Glendale
Salomone, Michael A.....New York
Santare, Vincent J.....Brooklyn
Santeramo, John E.....Jamaica
St. John, Herbert A.....Clifton Springs
Swartout, Roy III.....Buffalo
Swingle, Roy C.....Troy
Weiss, Bernard W.....New York
White, Thomas T.....New York
Wiles, Charles E.....Buffalo
Wilimarth, Charles K.....Richmond Hill
Winkler, Major B.....Brooklyn
Wolf, Howard I.....New York

North Carolina

Bennett, Truett V.....Asheville
Gordon, Lawrence E. Jr.....Durham
McElwee, Rose S. Jr.....Statesville
Pittman, Hal W.....Fairmont
Pittman, Dorn C.....Fairmont
Robertson, Merritt E.....Burnsville
Vann, Robert L.....Winston-Salem
Welborn, Samuel G.....Lexington

Ohio

Adair, Donald R.....Lorian
Ball, Alton J.....Caldwell
Breck, Richard W.....Toledo
Harvey, Joseph P. Jr.....Youngstown
Hayhurst, James D.....Columbus
Jones, Paul E.....Lima
Lane, Joseph A.....Cincinnati
Tiffany, Willim J. Jr.....Lakewood
Wichern, Homer E.....Euclid

Oklahoma

Barker, Nym L. Jr.....Broken Bow
McGraw, Willard L.....Oklahoma City
Morgan, Robert J.....Oklahoma City
Shinn, Carrol C.....Alfalfa
Vammen, Adolph N.....Oaks

Oregon

Leinassar, Jorma M.....Astoria
Steffanoff, Dan N.....Portland
Wood, Gerald DeM.....Portland

Pennsylvania

Adelman, Bernard P.....Philadelphia
Balin, Robert W.....Philadelphia
Barol, Daniel H.....Philadelphia
Beittel, Charles R. Jr.....Harrisburg
Birch, William B.....Point Marion
Donner, William T.....Sharpsville
Dowdell, William F.....Wilkes Barre
Duncan, William S.....Tarentum
Fontana, Armand L.....Pittsburgh
Frantz, Robert C.....St. Clair
Fulton, Albert E.....Hershey
Gallager, Harry S.....Chester
Gambone, Victor E.....Philadelphia
Gates, Robert P.....Coalport
Gold, Paul A.....Philadelphia
Greenberg, Harold A.....Philadelphia
McConnell, Edward L. Jr.....Philadelphia
Murphy, Francis J.....Pottsville
Parker, Charles R.....Sayre
Rafes, Earl H.....Philadelphia
Robertson, Hugh S. Jr.....Coraopolis
Rohrmayer, Francis P. Jr. West Chester
Roop, John W.....Blawnox
Sciubba, Rocco P. Jr.....Philadelphia
Sensening, David M.....Bala-Cynwyd
Shoemaker, Robert J.....Pittsburgh
Sillars, Charles H.....Oakmont
Terzian, Aram S.....Philadelphia
Townsend, James E. Jr.....Delmont
Wasley, Malcolm T.....Shenandoah

South Carolina

Burnette, Harvey L. Jr.....Cheraw
Lyles, Clarence C.....Chester
Mace, Luther M.....Waylyn
McRae, James T.....Winston-Salem
Nimmons, Rufus K... Jr.....Seneca

Texas

Childress, William B. B.....Stamford
Evans, Allan C.....Dallas
Kuehne, Benjamin A.....Austin
Luckett, Alfred E.....San Angelo
McCulloh, Albert M. Jr.....Penelope
Opper, Marshall.....Dallas
Penn, Rhesa L. Jr.....Austin

Utah

Mullikin, Walter T.....Salt Lake City
Ross, Aaron B.....Ogden
Thomas, William H.....Logan

West Virginia

Kamons, Edwin J.....Parkersburg
Knapp, Thomas S.....Charleston
Morgan, Jack C.....Fairmont
Raper, George T.....Glendale

Wisconsin

Bringe, James W.....Milwaukee
Davies, John A.....Milwaukee
McCrory, Wallace W.....Pewaukee
Paulson, Eric R.....Black River Falls
Pfeifer, William M.....Milwaukee
Roessler, Robert L.....Neillsville
Roisum, Bryant H.....Madison
Roth, James L. d'A.....Milwaukee
Taylor, Stewart F.....Portage
Theiler, Alvin C.....Tomahawk

Medical News

(Physicians will confer a favor by sending for this department items of news of general interest: such as relate to society activities, new hospitals, education and public health. Programs should be received at least two weeks before the date of meeting.)

CALIFORNIA

Personal.—The Alumni Association of the College of Medical Evangelists, Loma Linda, dedicated the March issue of its journal to the late Dr. Percy T. Magan, president of the college from 1928 to 1942 and president emeritus from then until the time of his death, Dec. 16, 1947.—Robert B. Witham, administrator of the Scripps Memorial Hospital, La Jolla, died July 4 of myocardial infarction.

Fellowship in Ophthalmology.—Alumnae of the Upsilon chapter of the Delta Gamma Sorority of Stanford University have presented the university $41,000 for a fellowship in ophthalmology. The gift represents proceeds of the sale of the sorority house following dissolution of Stanford sororities in 1944. Presentation of the gift, which fits into a national Delta Gamma alumnae project for the care and prevention of blindness, followed approval by the Superior Court of Santa Clara County of the dissolution of the Stanford Delta Gamma Association as a corporation. Sorority gifts also included a contribution to the building fund of the Palo Alto Society for Blind.

CONNECTICUT

Rural Health Conference.—A Rural Health Conference on August 11 is being arranged by the state medical society's committee as a feature of the annual Farm and Home Week at the University of Connecticut, Storrs. Mrs. Charles Sewell, Chicago, director of the Associated Women of the American Farm Bureau Federation, and Dr. Joseph H. Howard, Bridgeport, chairman of Connecticut's Commission on the Care and Treatment of the Chronically Ill, Aged and Infirm, will be the principal speakers.

Training Program in Cancer Control.—Yale University School of Medicine will establish in September a long range training program for cancer control officers. The Department of Public Health will work with the section on oncology of the department of surgery to provide a one year course for personnel who will specialize in the administration of programs caring for those with cancer. To head the new section on cancer control the university has appointed Dr. Edward M. Cohart, formerly cancer consultant, U. S. Public Health Service, as associate professor of public health. Establishment of the section was made possible by a grant of $24,000 from the U. S. Public Health Service National Cancer Institute. Three classes of students will be eligible for the instruction at Yale beginning in September: (1) physicians who have had at least two years in medical practice; (2) graduate nurses or persons who hold a bachelor's degree and possess at least three years of experience in medical or dental care or public health work; (3) special students who are not candidates for a degree, but who possess an appropriate background of training and experience. There will be cooperation with many agencies engaged in diagnosis, treatment, education and research in cancer. Information may be obtained from Dr. Edward M. Cohart, Cancer Control Section, Department of Public Health, Yale University School of Medicine, 310 Cedar Street, New Haven 11.

ILLINOIS

Deaths from Leprosy.—Among the unusual causes of death occurring in Chicago in 1947 was leprosy (2 deaths), according to the Illinois Department of Public Health. Since 1921, the first year for which accurate vital records for the state are available, there have been 6 deaths from the disease in Illinois. One death was reported in each of the years 1945, 1928, 1924 and 1922; all occurred in Chicago.

State Society Resumes Postgraduate Conferences.—The council of the Illinois State Medical Society, for the second time, has authorized twelve postgraduate conferences. The Seventh Councilor District has requested the first conference, September 16, in Centralia, with the Marion County Medical Society as host. The session will open with a luncheon at the Pittenger Hotel. The following program will be presented: Israel Davidsohn, Chicago, Clinical Applications of the Rh Factor; Hugo R. Rony, Chicago, Hormone Preparations and Their Uses; Warren H. Cole, Chicago, Surgical Lesions of the Stomach; Lester D. Odell, Chicago, Cesarean Section; Noel G. Shaw, Evanston, Feeding Problems in Infants; Allergic Conditions in Children, and Treatment of Congenital Syphilis with Penicillin. In the evening, Dr. Robert E. Britt, St. Louis, will discuss "Psychosomatic Medicine."

Chicago

Another Gift to Allergy Unit.—The Asthmatic Children's Aid has presented $10,000 to the University of Illinois Colleges of Medicine and Pharmacy for investigative work in allergy. This group has contributed almost $40,000 to the University of Illinois' Allergy Unit since it was established in November 1944.

Graduate Course in Otolaryngology.—The department of otolaryngology at Northwestern University Medical School will give a course of graduate training in the basic sciences of the ear, nose and throat, beginning in October. Each course lasts about nine months and will be divided into about equal portions of didactic, laboratory and clinical study.

Library to Abstract Atomic Energy Articles.—The Atomic Energy Commission and the John Crerar Library of Chicago have signed a contract by which the library will abstract scientific books and periodicals necesary to the research on atomic energy being done under the sponsorship of the commission. The commision will reimburse the library for all costs. The program calls for a special staff of experts to be established by the library to review the 3,500 periodicals received for material pertinent to research on atomic energy, translate it when necessary, abstract it and make it immediately available to the commission for distribution to its affiliated research laboratories. The interests of the research staff will cover largely the peacetime uses of atomic energy in medicine, metallurgy, agriculture and the like. The staff will also use the 700,000 books in the library in making searches on special subjects submitted by the commission. The library was established in 1895 under the will of John Crerar, who directed the establishment of a free public library. In the half century intervening, the library has built up its own collection of books and periodicals in science, technology and business and has acquired by purchase and gift many complete specialty collections. The Board of Directors of the library is headed by Britton I. Budd, president of the Public Service Company of Northern Illinois.

MAINE

State Medical Election.—At the annual meeting of the Maine Medical Association in Poland Springs, June 20-22, Dr. Forrest B. Ames, Bangor, was installed as president; Dr. Ralph A. Goodwin, Auburn, was chosen president-elect; Dr. C. Harold Jameson, Rockland, chairman of the council, and Dr. Frederick R. Carter, Portland, secretary-treasurer.

MASSACHUSETTS

Dr. Williams Goes to University of Washington.—Dr. Robert H. Williams, assitant professor of medicine at Harvard Medical School, Boston, became professor and executive officer in the Department of Medicine, University of Washington School of Medicine, Seattle, July 1. After receiving his M.D. degree from Johns Hopkins University School of Medicine, Baltimore, in 1934, he was a research fellow at Massachusetts General Hospital and served on the staffs of the Thorndike Laboratory and Boston and City hospitals. He joined the Harvard Medical faculty in 1940 as an instructor in medicine, and became an associate professor in 1944.

MICHIGAN

Pollen Survey.—The eighth annual ragweed pollen survey of the Michigan Department of Health began in fifty-three cities of the state on July 15. A new plan of operation is expected to make pollen counts for each area available on a day to day basis from the local health officers. Copies of the new 1947 survey report and pollen map, showing areas of greatest and least pollen concentration, are available without charge from the Michigan Department of Health, Lansing 4, Michigan.

Detroit Cancer Center.—All cancer activities in the metropolitan Detroit area are to be housed in the Detroit Cancer Center on John R and Hancock streets, which will also provide laboratory space for the Detroit Institute for Cancer Research. The Southeastern Michigan Division of the American Cancer Society, representing Macomb, Oakland and Wayne Counties, will have headquarters in the building. This organization has eight cancer detection centers operating in various Detroit hospitals and plans to open an additional center in the new head-

quarters. The center also furnishes facilities for an enlarged educational program. The building is owned by the Michigan Cancer Foundation. The Detroit Cancer Center is the result of a greatly expanded cooperative program that has been developed in the last few years between scientific and lay groups. It is planned to coordinate its research program of nearly two hundred projects with that now supervised by the National Research Council and subsidized by the American Cancer Society.

MISSOURI

Regional Blood Program.—The Greene County Community Blood Donor Service, sponsored by the local chapter of the American Red Cross and the Greene County Medical Society, became a regional service covering twenty-eight counties July 15. Dr. James R. Amos, former Greene County Health Officer, is medical director. A "bloodmobile" will make regular visits to all communities in a one hundred mile radius of Springfield, which is said to be the second community in the Midwest and the first in Missouri to establish a regional blood service program. The Greene County Medical Society Blood Donor Service Committee will remain active and act in an advisory capacity on medical problems.

MONTANA

Personal.—Dr. Richard C. Monahan, Butte, was elected president of the Montana State Board of Health at its meeting in March, and Dr. Burton K. Kilbourne, Helena, who has been secretary of the board and executive officer, was reelected for a term of two years.——Dr. Edmund A. Welden, Lewistown, a member of the State Board of Medical Examiners for many years, was recently elected president of the board, succeeding Dr. Patrick E. Kane, Butte.

Lectures on Cancer.—Dr. John I. Brewer, associate professor of gynecology at Northwestern University Medical School, Chicago, has completed a series of five lectures to physicians in Montana, speaking at Miles City, Billings, Lewistown, Bozeman and Helena on differential diagnosis and early cancer detection. These lectures were made available to physicians by the Montana State Board of Health, Montana Medical Association and the Montana Division of the American Cancer Society. Additional specialists on cancer will be brought to Montana to speak from time to time throughout the year.

NEW JERSEY

Emergency Medical Service.—The Monmouth County Medical Society on July 8 began a twenty-four hour a day emergency service that will be linked by telephone with all police, fire and first-aid stations in the county. The service is said to be the first in the country instituted on an areawide basis.

Service for the Chronically Ill.—The Essex County Chronic Ill Service, established in Newark, will maintain a registry for families, doctors and organizations caring for the chronic ill and will develop additional visiting nurse facilities. The organization also will assemble statistics, further legislation for aid to the chronically ill and serve as an advisory center. The service is patterned after those in Philadelphia and Chicago.

NEW YORK

Postgraduate Instruction.—The Medical Society of the State of New York, with the cooperation of the New York State Department of Health, has arranged postgraduate instruction for the Tompkins County Medical Society, September 20, 8:30 p. m., at the Tompkins County Memorial Hospital, Ithaca. Dr. Kristian G. Hansson, Cornell University Medical College, New York, will speak on "Prescription in Physical Medicine."

County Society Appoints Executive Secretary.—The Medical Society of the County of Monroe has appointed Miss Helen R. Guntert, executive secretary of the Rochester Academy of Medicine, as its executive secretary. She will head the new executive department created by the society and serve as managing editor of its county bulletin. The society has opened enlarged quarters on the second floor of the academy building.

New York City

Personal.—Dr. Henry M. Scheer has been elected president of the New York University College of Medicine Alumni Association.—Dr. Golden Selin has been appointed assistant pathologist at the Hospital for Joint Disease, replacing Dr. Louis Lichtenstein. Dr. Selin was formerly an instructor in pathology at the New York Medical College.—Dr. Elaine P. Ralli, associate professor of medicine, New York University College of Medicine, on April 29 was reelected president of the Women's Medical Association of New York City.—Dr. Claude W. Munger, director of St. Luke's Hospital for eleven years, has resigned and will be succeeded by Dr. Lloyd H. Gaston, who has been assistant director.—The board of trustees of the New York Polyclinic Medical School and Hospital has named one of the operating rooms "The Brennan Operating Room" in honor of Dr. Robert E. Brennan, director of surgery, who has been associated with the institution for many years.

Forum on Venereal Disease Control.—Lectures and demonstrations on the diagnosis, treatment and management of venereal diseases will start at the New York City Department of Health, September 18. There will be fourteen weekly meetings, on the following Saturdays, presided over by experts in various fields of venereal disease control. Sessions will start at 10:30 a. m. and will be held in the second floor auditorium at 125 Worth Street, Manhattan. The lecture topics have been selected for physicians, social workers, nurses, laboratory workers, industrial medicine personnel and teachers. No registration or fee is required.

Health Education Institute.—The New York University School of Education will begin a series of annual health education institutes August 16-September 3. The first institute will be on problems in alcohol education. The Alcohol Education Institute lecturers will include: Dr. Ralph S. Banay, research associate, Columbia University; Dr. I. Jay Brightman, Brooklyn, division of medical services, New York State Department of Health; Brigadier General Chester R. Brown of the Salvation Army; Anton J. Carlson, Ph.D., professor of physiology, University of Chicago; Dr. Harvey B. Haag, dean, Medical College of Virginia, Richmond; Mr. Joseph Hirsh, Research Council on Problems of Alcohol, New York; Edward J. McGoldrich Jr., City of New York Bureau of Alcohol Therapy; Dr. Mary Jane Sherfey, Cornell University Medical College, New York, and Rev. Alson J. Smith, Roxbury Methodist Church, Stamford, Conn.

OHIO

Dr. Ernstene Appointed Head of Department.—Dr. A. Carlton Ernstene, Cleveland, has been appointed head of the division of medicine at the Cleveland Clinic. Dr. Ernstene joined the clinic staff in 1932 and for many years has been head of the section on cardiovascular disease. He received his medical training at the State University of Iowa College of Medicine, Iowa City, and was a member of the faculty of Harvard Medical School, Boston, from 1927 to 1932. He was recently elected president of the Cleveland Cardiovascular Society and is a director of the Academy of Medicine of Cleveland. During World War II he was on active duty with the Navy in the South Pacific area.

PENNSYLVANIA

Cancer Control Appointment.—Dr. Leverett D. Bristol, Augusta, Maine, has been appointed chief of the cancer control division of the state department of health. He is a graduate of Johns Hopkins University, Baltimore, has a public health degree from Harvard University, Boston, and organized the state cancer committees in North Dakota and Maine.

Philadelphia

Professor of Ophthalmology at Jefferson.—Dr. Arno Emerson Town, clinical professor of ophthalmology, New York University College of Medicine, was appointed professor of ophthalmology at the Jefferson Medical College on July 1, succeeding Dr. Charles E. G. Shannon, whose retirement becomes effective on that date. Dr. Town graduated from Jefferson in 1926. He also received a Master of Medical Science degree in ophthalmology from the University of Pennsylvania School of Medicine in 1931. During the last war he served as a commander in the United States Naval Reserve as ophthalmologist at the United States Naval Medical Center, Bethesda, Md., and aboard the hospital ship *U. S. S. Benevolence.*

Medical Center Plans Announced.—Plans for a $10,000,000 medical center at the University of Pennsylvania Medical School and Hospital have been announced. The medical center will include a nine story outpatient building, an eleven story inpatient building and a nine story nurses' home to be built at an estimated cost of $8,500,000. An additional $1,500,000 will be required by the department of medicine to support teaching and research. A conditional contribution of $1,000,000 from the Donner Foundation, Inc., will go toward the construction of a group diagnostic outpatient clinic, provided the university starts construction on the building by May 1949. The campaign for the medical center is part of a $22,000,000 development program for the university, covering eleven of its schools and departments.

GENERAL

Board Appoints Assistant Secretary.—The American Board of Obstetrics and Gynecology announces that it has established the position of assistant secretary and that Dr. Robert L. Faulkner, Cleveland, has been appointed to this new post. All communications should be addressed as heretofore to Paul Titus, M.D., Secretary, 1015 Highland Building, Pittsburgh 6.

National Medical Association Meeting.—The annual meeting of the National Medical Association will be held in New York August 16-20 with headquarters at Wadleigh High School and under the presidency of Dr. J. A. C. Lattimore, Louisville, Ky. After the opening meeting the scientific assembly will hold section meetings at hospitals of the city. The Women's Auxiliary will meet in conjunction with the association.

Atomic Energy Fellowships.—For consideration at the next meeting of the Atomic Energy Commission Postdoctoral Fellowship Board in the Medical Sciences in late September, applications must be sent to the office of the board in the National Research Council before Sept. 1, 1948. Inquiries should be addressed to the Division of Medical Sciences, National Research Council, 2101 Constitution Avenue, N.W., Washington 25, D. C.

Appointed Secretary of Pharmacopoeil Convention.—The board of trustees of the United States Pharmacopoeial Convention have reelected Robert L. Swain, New York, and Adley B. Nichols, Philadelphia, as chairman and secretary. Mr. Nichols fills a vacancy caused by the resignation of Lewis E. Warren, Ph.C., who has served the convention as secretary since 1930. Dr. Warren has retired from government service where he had been a chemist for many years. The convention will meet at the Statler Hotel, Washington, D. C., May 8-10, 1950.

Dr. Page Goes to Arabia.—Dr. Robert C. Page, formerly assistant medical director of the Texas Company, has been appointed medical director of the Arabian American Oil Company and has left for Arabia, where the Arabian American Oil Company has new base hospital. Dr. Page is a graduate of Syracuse University College of Medicine, Syracuse, 1933, and was formerly associated with the Mayo Clinic, Rochester, Minn. During World War II he served as a major in the U. S. Army Medical Corps and engaged in malaria control in the South Pacific.

Red Cross Board of Governors.—The American Red Cross, at its meeting in San Francisco in June, elected Mrs. Arthur H. Vandenberg to fill the unexpired term of the late Judge Stanley L. Orr, Cleveland. Those elected to three year terms on the board were: Mrs. J. K. B. Hare, Pittsburgh, and Harold A. Young, Little Rock, Ark. Those reelected to the board were Clarence Bamberger, Salt Lake City; Sheldon Coleman, Wichita, Kan.; John B. Hollister, Cincinnati; Charles H. Kellstadt, Chicago; Howard S. Wilson, Lincoln, Nebraska; Edward Dana, Boston; Junius P. Fishburn, Roanoke, Va., and Robert N. Haskell, Bangor, Maine.

Meeting of Occupational Therapists.—The American Occupational Therapy Association will hold its thirty-first annual convention at the Hotel Pennsylvania, New York City, September 7-11. Among the speakers are: Dr. Howard A. Rusk, New York; Mr. Holland Hudson, director of rehabilitation service, National Tuberculosis Association; Luther Woodward, field consultant to the National Committee for Mental Hygiene; Dr. Leland E. Hinsie, New York, assistant director, New York State Psychiatric Institute and Hospital. On Septmeber 10 and 11, a teaching institute will present recent developments and technics in the treatment of neuropsychiatric conditions. Trips to hospitals and other institutions in New York City and surrounding areas on September 9 and 10 have been arranged.

Appointments at The Rockefeller Institute.—The board of scientific directors of the Rockefeller Institute for Medical Research announces the promotion of Alfred E. Mirsky, Ph.D., and D. Wayne Woolley, Ph.D., from associate member to member, and the appointment of Dr. Reginald M. Archibald as member. Dr. Maclyn McCarty has been promoted from associate to associate member. New appointments include: associate —Dominic Dziewiatkowski; assistants—Margaret Oakley Dayhoff, Jacques Genest, Herbert Jaffe, Edwin D. Kilbourne, George E. Palade, Stanfield Rogers, Chandler A. Stetson Jr., Harrison F. Wood, and Mr. R. Barclay McGhee. The board also announces that Donald D. Van Slyke, who has reached the age of retirement, has been made member emeritus of the institute.

Dysentery Registry.—The Pan-American and International Dysentery Registry has a two-fold objective for 1948: (1) the prevention of acute intestinal infections; (2) the accumulation of data on chronic ulcerative colitis. It is again urging control of the cleanliness of food and foodhandlers in cities, summer resorts and on vehicles of transportation; proper disposal of sewage and supervision of water supplies; fly control; prompt reporting and epidemiologic investigation of all infectious diarrheas. A motion picture, "From Hand to Mouth," may be borrowed from the Registry without cost by any teaching institution. Consultative facilities on clinical, epidemiologic, bacteriologic or pathologic problems are also available at the Registry without cost. The Registry is appealing for accurate follow-up data for one year on all cases of acute bacillary dysentery.

Study of Physical Effects of Swimming.—A tri-state survey of Lake Michigan waters with special reference to bathing is being made by the Illinois, Indiana and Wisconsin state health departments and local governmental health agencies, coordinated by the U. S. Public Health Service. The study will extend from Milwaukee, Wis., to Michigan City, Ind. The survey aims:

1. To determine the physical, chemical and bacteriologic conditions of the waters tributary to and at bathing areas.
2. To investigate the physical factors which influence the changes in water quality.
3. To study the effects of bathing loads on water quality.
4. To secure epidemiologic data on diseases attributable to bathing.

In each area 1,000 families will be asked to record unusual reactions to bathing or any symptoms of illness such as eye, ear, nose, throat, skin infections or gastrointestinal upsets. Medical students and public health nurses began a house to house canvas June 28.

National Employ the Physically Handicapped Week.—The President of the United States has appointed a committee on National Employ the Physically Handicapped Week composed of outstanding Americans who are helping to spearhead the drive for employment of the handicapped. The efforts of the committee are expected to increase public education and information on the subject. The chairman of the committee is Vice Admiral Ross T. McIntire, U.S.N. (retired), and the vice chairman is Merle E. Frampton, LL.D., New York, who also is head of the executive committee. Many of the subcommittees have already held meetings, and among the matters under consideration were awards of merit to employers who cooperate in the employment of impaired workers and formation of labor and management employment institutes at a number of colleges throughout the country. The chairman of the medical committee is Dr. Carl M. Peterson, Secretary of the Council on Industrial Health of the American Medical Association, Chicago; the vice chairman is Dr. George Morris Piersol, Secretary General, The American College of Physicians, Philadelphia.

Poliomyelitis in the United States.—According to the U. S. Public Health Service for the week ended July 10, a total of 513 cases of poliomyelitis was reported, as compared with 362 the previous week. The largest number of cases continue to be reported in North Carolina, with 131, California, 92, and Texas, 89, reported 37 per cent of the total, as compared with 64 per cent week of July 3. In North Carolina the counties from north to south in the central and west central parts of the state were apparently bearing the brunt of the epidemic; the extreme western counties and the coastal areas have reported only a few scattering cases. In Texas the disease was first prevalent in counties in the southern and south coastal areas, but more recently a shift was apparent from South Texas and the coast to the central and northern parts of the state. Although no epidemic incidence has been reported in other states, an increased proportion of the total cases is being reported from other than the three states mentioned. In addition to these three states, only seven other states reported more than 10 cases during the week, as follows (figures for week of July 3 in parentheses): Oklahoma 21 (3), Iowa 19 (0), Virginia 17 (2), Ohio 15 (14), Illinois 12 (6), New York 11 (7) and Nebraska 11 (8). To date only 14 cases have been reported in the six New England states—8 in Massachusetts, 4 in Connecticut and 2 in Vermont. The total to date for the country as a whole is 2,881, as compared with 1,294 in 1947, 2,165 in 1946 and a five year median of 1,329 for the corresponding period.

CORRECTION

Postgraduate Courses.—On page 722 of THE JOURNAL for June 19, 1948, the courses offered by the Graduate School of Medicine of the College of Medical Evangelists were incorrectly stated. The graduate courses offered are basic science courses in internal medicine, general surgery, gynecology and obstetrics, urology and otolaryngology. The fee for each of these courses is $700.

Deaths

George Tully Vaughan ✦ professor of surgery emeritus, Georgetown University School of Medicine, Washington, D. C., died, April 26, aged 88, of cerebral hemorrhage. Dr. Vaughan was born in Arrington, Va., June 27, 1859. He graduated in medicine from the University of Virginia Department of Medicine, Charlottesville, in 1879 and from the Bellevue Hospital Medical College in New York in 1880, then did graduate work at the New York Polyclinic, University of Berlin and Jefferson Medical College in Philadelphia. After a period of private practice, he entered the U. S. Marine Hospital Service in 1888, serving in this country and abroad until he resigned in 1906, after having reached the grade of assistant surgeon general. During the Spanish-American War he was loaned to the U. S. Army and served as major and brigade surgeon of the Seventh Army Corps at Jacksonville, Fla.; he was a navy surgeon at Vera Cruz in 1914, and again during World War I, serving aboard the *U.S.S. Leviathan*. Dr. Vaughan was appointed to the chair of principles and practice of surgery at Georgetown in 1897 and was active in teaching for thirty-six years. Since 1933, when he became professor of surgery emeritus, he had been a member of the executive faculty and council and administrative advisor to the school. He was past president of the Washington Surgical Society and in 1907-1908 was president of the Association of Military Surgeons of the United States. He was a member of the International Surgical Association, American Surgical Association and the Southern Surgical Association. He was also a founder of the American College of Surgeons and a member of the founders' group of the American Board of Surgery. In 1897 when the Georgetown University Hospital was established, he was appointed chief surgeon. For many years he was surgeon for the Tuberculosis Hospital and consulting surgeon at St. Elizabeth's and Washington Asylum hospitals and the Veterans Bureau, now the Veterans Administration. In October 1944, an oil portrait of Dr. Vaughan was presented to the medical school by members of the medical alumni association; in 1919 he received the degree of Doctor of Laws from Georgetown. Dr. Vaughan was the author of a textbook on "Principles and Practice of Surgery" in 1903 and a volume of "Papers on Surgery and Other Subjects" in 1932.

Guy Hinsdale ✦ Charlottesville, Va.; born in Brooklyn, Oct. 26, 1858; University of Pennsylvania Department of Medicine, Philadelphia, 1881; member of the West Virginia State Medical Association, American Association for the History of Medicine and the American Neurological Association; served as vice president of the American Academy of Medicine and secretary from 1894-1918, president in 1919 of the American Clinical and Climatological Association, and past president of the Pennsylvania Society for the Prevention of Tuberculosis; member of the English-Speaking Union, American representative of the International Society of Medical Hydrology and fellow of the Royal Society of Medicine, London; in 1937 member of the Congrès International du Tourisme du Thermalisme et du Climatisme; for many years assistant physician at the Orthopedic Hospital and Infirmary for Nervous Diseases and Presbyterian Hospital in Philadelphia; medical director of the Homestead at Hot Springs, Va., from 1904 to 1929, when he was appointed medical director at the Greenbrier at White Sulphur Springs, serving in this capacity until, in 1942, it became the U. S. Army Ashford General Hospital; during World War I was a member of the medical staff named by the Navy to give instructions to newly commissioned officers of that branch of the service; at one time on the faculties of the University of Pennsylvania School of Medicine and the Medico-Chirurgical College of Philadelphia; received the Alvarenga prize from the College of Physicians of Philadelphia in 1895, Boylston prize from Harvard in 1898 and the Hodgkins prize from the Smithsonian Institution in 1914 for his essays on "Syringomyelia," "Acromegaly" and "Atmospheric Air in Relation to Tuberculosis," respectively; author of a book on hydrotherapy; died April 27, aged 89, of paralysis and pneumonia.

Gardner Ellis Robertson ✦ Captain, U. S. Navy, retired, Yonkers, N. Y.; born Ransomville, N. Y., Feb. 17, 1883; University of Buffalo School of Medicine, 1906; appointed to the medical corps of the U. S. Navy in 1909; was a medical officer on board the *U. S. S. Memphis* when that vessel was beached by a tidal wave near Santo Domingo prior to World War I; commanded the Naval Medical Supply Depot in Brooklyn from 1936 to 1939 and was the senior medical officer of the *U. S. S. Relief* just prior to the outbreak of World War II; in 1941 assigned as medical officer in command of the Naval Hospital at Brooklyn; retired for physical disability on Jan. 1, 1943; following his retirement was retained on active duty in command of the Naval Hospital at Brooklyn until Feb. 1, 1947, when he was placed on inactive status; awarded a letter of commendation, with ribbon, by the Secretary of the Navy for his services in command of the Naval Hospital at Brooklyn during World War II; fellow of the American College of Surgeons; died in St. Petersburg, Fla., March 27, aged 65.

John Auer, St. Louis; born in Rochester, N. Y., March 30, 1875; Johns Hopkins University School of Medicine, Baltimore, 1902; professor and head of the department of pharmacology at St. Louis University School of Medicine; appointed pharmacologist at the Rockefeller Institute for Medical Research in New York, serving until 1921 with the exception of a year as an instructor in physiology, Harvard Medical School, Boston; member of the American Association for the Advancement of Science, the American Physiological Society, Association of American Physicians, Harvey Society and St. Louis Academy of Science; secretary from 1912 to 1916 and president from 1924 to 1927 of the American Society for Pharmacology and Experimental Therapeutics; vice president from 1917 to 1919 of the Society for Experimental Biology and Medicine; major, Medical Officers' Reserve Corps from 1917 to 1922; for many years pharmacologist for St. Mary's group of hospitals; research studies which he conducted included investigations on digestion, respiration, heart, the physiologic action of various drugs, functional disturbances caused by anaphylaxis, war gases, tetanus, reflexes, connective tissues, liver and gallbladder; died in St. Mary's Hospital April 30, aged 73, of rupture of aortic aneurysm.

Richard Sisson Austin ✦ Cincinnati; born in Providence, R. I., on April 18, 1885; Harvard Medical School, Boston, 1911; Mary M. Emery professor of pathology at the University of Cincinnati College of Medicine; instructor in bacteriology at his alma mater from 1913 to 1915; served as president of the Public Health Federation of Cincinnati, Cincinnati Academy of Medicine and the Ohio Society of Pathologists; vice president of the board of health of Cincinnati; member of the American Association of Pathologists and Bacteriologists and the American Society for Experimental Pathology; director of the pathologic service at Cincinnati General Hospital; consultant at the Children's, Dunham and Hamilton County Home and Chronic Disease hospitals; died in Christian R. Holmes Hospital April 30, aged 63, of carcinoma of the pancreas.

Frederick William Adams ✦ Carmel, Calif.; born in London, Ontario, Nov. 20, 1880; Western University Faculty of Medicine, London, Ont., Canada, 1906; member of the Washington State Medical Association, American Academy of Ophthalmology and Otolaryngology and the Pacific Coast Oto-Ophthalmological Society; fellow of the American College of Surgeons; past president of the Puget Sound Academy of Ophthalmology; at one time practiced in Seattle, where he was a member of the staffs of the Swedish and King County hospitals and consulting laryngologist at Children's Orthopedic Hospital; oculist, Northern Pacific Railway; died April 1, aged 67, of coronary occlusion.

William Elliott Gamble ✦ Santa Monica, Calif.; born in Palermo, Ohio, April 9, 1860; Rush Medical College, Chicago, 1886; an Affiliate Fellow of the American Medical Association; member of the Illinois State Medical Society; fellow of the American College of Surgeons; specialist certified by the American Board of Ophthalmology; in 1931 retired from practice in Chicago, where he was professor of ophthalmology emeritus at the University of Illinois College of Medicine, attending ophthalmologist at the University Hospital and a member and past president of the Chicago Ophthalmological Society; died April 23, aged 88, of cerebral hemorrhage.

Bryant Robert Simpson, San Diego, Calif.; born in Venango, Neb., June 24, 1887; University of Nebraska College of Medicine, Omaha, 1910; fellow of the American College of Chest Physicians; member of the American Medical Association, American Trudeau Society and the medical section of the National Tuberculosis Association; past president of the San Diego County Medical Society; served during World War I; formerly attached to the U. S. Public Health Service; during World War II procurement and assignment officer; served on the staff of Mercy Hospital, where he died recently, aged 60, of bronchogenic carcinoma.

Grover Asa Silliman ✦ Sayville, N. Y.; Baltimore Medical College, 1913; treasurer of the Suffolk County Medical Society; served during World War I; for many years coroner of Suffolk County; from 1919 to 1924 superintendent of the Delaware County Tuberculosis Sanitarium at Delhi, where he was county coroner; medical inspector for the Sayville, Oakdale, Bohemia

and Holbrook public schools; affiliated with Southside Hospital, Bay Shore, Central Islip (N. Y.) State Hospital and Mather Memorial hospital, Port Jefferson; died April 27, aged 57, of coronary occlusion.

William Burton Newton, Alpena, Mich.; born in Decatur, Texas, in 1881; Chicago College of Medicine and Surgery, 1911; specialist certified by the American Board of Ophthalmology and the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; for one term president and for three terms secretary of the Alpena County Medical Society; served during World War I; on the staff of Alpena General Hospital; died April 19, aged 67, of coronary disease.

John Clark Arnout, Los Angeles; John A. Creighton Medical College, Omaha, 1907; member of the American Medical Association; on the staff of the Culver City (Calif.) Hospital, where he died March 13, aged 69, of coronary disease.

Morgan Willcox Ayres, Wallingford, Conn.; College of Physicians and Surgeons, medical department of Columbia College, New York, 1875; died in the New York Hospital March 27, aged 96.

David Edwin Baird, Port Orford, Ore.; Baltimore Medical College, 1906; died in McAuley Hospital, Coos Bay, March 30, aged 71, of coronary thrombosis, diabetes mellitus and acute lymphatic leukemia.

Manuel Jay Brown, Salina, Kan.; the Hahnemann Medical College and Hospital, Chicago, 1882; member of the American Medical Association; died March 6, aged 89, of arteriosclerotic heart disease.

Stewart M. Brown, Keechi, Texas (licensed in Texas, under the Act of 1907); died March 2, of cerebral hemorrhage.

Boleslaw Michael Bukowski, Buffalo; University of Buffalo School of Medicine, 1916; member of the American Medical Association; died March 24, aged 54, of coronary thrombosis.

Abner Theodore Clopton, Milan, Tenn.; Vanderbilt University School of Medicine, Nashville, 1902; formerly on the staffs of various Veterans Administration hospitals; served during World War I; died March 18, aged 71.

William Harrison Coffey, Kansas City, Mo.; Missouri Medical College, St. Louis, 1886; member of the American Medical Association; formerly county coroner; served on the staff of Kansas City General and St. Joseph hospitals; died March 25, aged 86, of coronary disease.

R. P. Dickey, Caddo, Okla. (licensed in Oklahoma under the Act of 1908); associated with Wilson N. Jones Hospital in Sherman, Texas, where he died March 20, aged 74, of coronary thrombosis.

John Euclid Fish ✦ Canton, Mass.; Dartmouth Medical School, Hanover, N. H., 1896; past president of Norfolk District Medical Society; for many years superintendent of the Massachusetts Hospital School; died in Auburndale March 30, aged 75, of myocardial infarction.

Leon Ferdinand Garrigues, New York; University of the City of New York Medical Department, 1891; member of the American Medical Association; died April 4, aged 78, of coronary thrombosis.

Charles Ellis Guthrie ✦ Seattle; University of Minnesota College of Medicine and Surgery, Minneapolis, 1902; died April 3, aged 79, of carcinoma of the prostate.

William H. Harris, Samoset, Fla.; University of Tennessee Medical Department, Nashville, Tenn., 1888; died March 12, aged 81.

Albert B. Headley ✦ Cambridge, Ohio; College of Physicians and Surgeons, Baltimore, 1902; past president and secretary of the Guernsey County Medical Society; county health commissioner; surgeon for the Baltimore and Ohio Railroad; died March 5, aged 73, of coronary occlusion.

Judge James, Ackerman, Miss.; Memphis (Tenn.) Hospital Medical College, 1904; member of the American Medical Association; for many years county health officer; died in Grenada, March 22, aged 67, of Adams-Stokes disease.

Ivar Janson, Oceano, Calif.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1892; at one time practiced in Seattle, where he served as president of the board of health; died March 21, aged 79.

I. Warner Jenkins ✦ Waco, Texas; Chattanooga (Tenn.) Medical College, 1901; specialist certified by the American Board of Radiology, Inc.; member of the American Academy of Dermatology and Syphilology, Radiological Society of North America, Inc., and the American College of Radiology; fellow of the American College of Physicians; member and past president of the McLennan County Medical Society and of the Texas Radiological Society; died March 1, aged 67, of carcinoma of the prostate.

Clay Johnson, Fort Worth, Texas; College of Physicians and Surgeons, Baltimore, 1891; served as president of the city board of education and as a member of the county welfare board; during World War II a member of the county war price and rationing board; a director of the First National Bank; died March 7, aged 81, of hemiplegia.

Frank Goldsmith Lockwood ✦ Penn's Grove, N. J.; University of Buffalo School of Medicine, 1942; member of the Medical Society of the State of New York; certified by the National Board of Medical Examiners; served with the medical division of the E. I. du Pont de Nemours and Company; died March 9, aged 31, of brain tumor.

John W. Marcy, Merchantville, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1885; died March 8, aged 85, of cerebral thrombosis and arteriosclerosis.

Donald McElderry, Princeton, Iowa; State University of Iowa College of Medicine, Iowa City, 1908; member of the American Medical Association; served during World War I; at one time practiced in Ottumwa, where he was county physician; died in Veterans Administration Hospital, Des Moines, March 15, aged 74.

Horace Victor Pike, Danville, Pa.; University and Bellevue Hospital Medical College, New York, 1899; member of the American Psychiatric Association; for many years clinical director of the Danville State Hospital; from 1938 to 1944 consulting psychiatrist at the Geisinger Memorial Hospital, where he died March 31, aged 71, of acute cholecystitis and congestive heart failure.

William Surber Porter, Oakland, Calif.; University of Pennsylvania Department of Medicine, Philadelphia, 1896; fellow of the American College of Surgeons; served on the staffs of the Samuel Merritt, East Bay, Peralta and Fabiola hospitals; died March 24, aged 80, of heart disease.

Raymond Dustin Potts ✦ Dayton, Ohio; University of Cincinnati College of Medicine, 1918; on the staffs of the Miami Valley Hospital, St. Elizabeth's Hospital and the Good Samaritan Hospital, where he died March 24, aged 58, of rheumatic heart disease.

Frank Joseph Ronayne ✦ River Forest, Ill.; Yale University School of Medicine, New Haven, 1904; member of the Radiological Society of North America, Inc.; at one time affiliated with the Veterans Administration Hospital in Maywood; on the staff of the West Suburban Hospital in Oak Park; served during World War I; died in St. Petersburg, Fla., March 24, aged 71, of pneumonia.

Fred Seymour Saruk, Chicago; Chicago Medical School, 1936; member of the American Medical Association; died in the Winfield Hospital March 14, aged 40, of pulmonary tuberculosis.

Benjamin Franklin Scaiefe, Vida, Ore.; St. Louis Medical College, 1887; served during World War I; died March 10, aged 82, of angina pectoris.

Frank Sheehy ✦ San Francisco; College of Physicians and Surgeons of San Francisco, 1920; fellow of the American College of Surgeons; served on the faculty of his alma mater; on the staffs of St. Francis and St. Joseph's hospitals; died March 13, aged 55, of injuries received in an automobile accident.

William Albert Simpson, Indiana, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1895; member of the American Medical Association; past president of the Indiana County Medical Society; on the staff of Indiana Hospital; member of the board of trustees of the Indiana State Teachers College; served as a member of the board of education; died March 30, aged 76, of coronary embolism.

Amedeo Trappolini, Ashland, Miss.; Middlesex College of Medicine and Surgery, Cambridge, 1922; also a minister; died April 17, aged 59, of injuries received when run over by a truck.

John Henry Von Dreele ✦ Baltimore; University of Maryland School of Medicine, Baltimore, 1910; affiliated with Maryland General Hospital, where he died March 2, aged 63, of ruptured abdominal aorta.

William Young Ward ✦ Dodd City, Texas; Medical Department of Tulane University of Louisiana, New Orleans, 1901; died March 25, aged 77, of heart disease.

John Knox Webster, Athens, Texas; Kentucky School of Medicine, Louisville, 1891; member of the American Medical Association; one of the founders and past president of the Henderson County Medical Society; past president of the Eleventh District Medical Society; for four years county health officer; served during World War I; died March 18, aged 81, of pulmonary embolism.

Foreign Letters

LONDON

(From Our Regular Correspondent)

June 24, 1948.

Pulmonary Valvotomy for Congenital Pulmonary Stenosis

Mr. R. C. Brock, Surgeon to Guy's Hospital, has described (*British Medical Journal*, June 12, p. 1121) an advance in cardiac surgery. In 3 cases he performed a direct operation on the pulmonary valves for the relief of pulmonary stenosis. The patients are all alive and their cardiac condition has been improved. A few previous attempts to relieve pulmonary stenosis by operation on the valves have been recorded, but success has been claimed in only 1, recorded by Cutler and Beck in 1929, in which the patient survived four and one-half years and was thought to have been improved. These earlier cases have left the impression that direct surgical attack on the diseased valves is too dangerous to be practicable. Mr. Brock used a special valvulotome for division of the stenosed valve, which enabled the stenosis to be located and divided almost instantaneously. The valvulotome has a gentle curved shaft ending in a blade like a spearhead and carrying a short probe end. A pair of gently curved dilating forceps with fine blades were used after the valvulotome.

In the first case the patient was a girl aged 18, who had been cyanosed from birth. She had great difficulty in getting about and could rarely walk more than 50 yards (45.7 meters). There was a rough systolic murmur, loudest in the pulmonary area, and a faint systolic thrill. After the operation, which was performed on Feb. 16, 1948, she steadily improved. In spite of symptoms on February 24 suggesting arterial occlusion, probably embolic, in the legs, she further improved. On April 10 cyanosis was absent, the finger nails were pink and she walked about the room without dyspnea. It is too early to assess the final result.

The Labeling of Ampules of Anesthetic Drugs

To avoid mistakes the Associations of Anesthetists, British Chemical Manufacturers and the Wholesale Drug Trade have, under the aegis of the Ministry of Health, recommended indelible marking, rather than paper labels, for all ampules containing solids, solutions and solvents which are used for the production of muscular relaxation, spinal, regional or local analgesia and general anesthesia by intratracheal, epidural, intravenous or intramuscular injection or by tissue infiltration. The marking on ampules should be such as will remain legible throughout sterilization of the outside surface and during storage in disinfectant solutions.

The Government and Radioactivity Dangers

A bill to protect workers and the public against the dangers of radioactivity has been introduced by the Government. In moving the second reading in the House of Commons the Minister of Health, Mr. A. Bevan, said that we were now on the verge of vastly extended use of radioactivity. Artificial radioactive substances—radioactive cobalt and radioactive iodine—were becoming available for therapeutic use. They had tremendous dangers and possibilities. In the hands of competent persons there was no danger, but it had been established that the effect of exposure to radioactive substances of high emission was insidious, the consequences over a number of years being possibly fatal. He had been strongly advised by experts that it was necessary to make provision for protection against the possibilities opened up. It was important that Ministers should be given unusual powers, many of which were novel, because of the great difficulty of defining what they were talking about. The gradation from smaller to greater radioactivity was a difference of degree—the difference between a luminous watch and an atomic bomb. Regulations had to be flexible, and to avoid abuse the Government would adopt a new procedure. An advisory committee would be set up, for which the following had been asked to nominate members—the Medical Research Council, the Royal Society, the three Royal Medical Colleges and the Medical Corporations for Scotland, the Faculty of Radiologists, the Department of Scientific and Industrial Research, the British X-Ray and Radium Protection Society, the British Employers Federation and the Trade Union Council. No regulations would be made without this committee's seeing the draft first.

In the discussion it was declared that no other course was open to the Minister than the adoption of such sweeping powers. It was also suggested that there might be a danger at some time of distribution of radioactive material by enemies of the country. Measures should be taken to prevent our reservoirs from being subjected to such attacks. The bill was read a second time.

BUENOS AIRES

(From Our Regular Correspondent)

July 12, 1948.

New Cardiologic Experiments

Dr. Alfredo Lanari, working in the Institute of Professor Raúl F. Vaccarezza of the Medical Faculty in Buenos Aires, resected circular segments of 1 to 2 cm. of the thoracic aorta of dogs and stitched the ends without interrupting the circulation for more than five minutes (method used by Carrel). For this purpose he employed a glass tube through which the blood circulates while the suture is made. After suturing, one withdraws the tube, removing with special caution the clots which have been formed between the walls of the aorta and the tube. The test animals showed that the interruption of the circulation of the thoracic aorta, with two intercostals tied, originates lesions which are reversible within seventeen to eighteen minutes, but almost never after twenty-two minutes, causing extensive paraplegia.

Furthermore, Lanari and Molins could extirpate fragments of the mitral valve; many of these animals, however, died of embolism. The hemorrhage, on the other hand, could be easily controlled. Three of the surviving animals showed bacterial endocarditis. If dogs operated on in this way are operated on again a year later, great dilatation of the left auricle and hypertension of the pulmonary circuit are found. The maximum murmur of mitral insufficiency, when auscultation was done directly over the heart, was found in the auriculoventricular groove and the left auricle and spread through the pulmonary veins. Intense murmurs were not heard at the apex of the heart; therefore the valvular origin of the systolic murmur heard in the region of the apex of certain persons seems to be problematic.

Lanari and Sampietro made in dogs a venovenostomy between a pulmonary vein and the vena azygos major, in order to alleviate the congested pulmonary circulation in mitral stenosis and insufficiency. Through the procedure a venovenous fistula is made. The operation is simple, but thrombosis is frequent.

International Congress on Echinococcosis

This congress was held in Azul (Province of Buenos Aires) with the assistance of representatives of Brazil, Chile, Panama, Paraguay, Uruguay, Venezuela and specially invited guests of other Latin-American countries, as well as from Italy, Netherlands and Spain. The minister of public health of the province stated that Argentina has a high degree of Echinococcus infections which has considerably increased since 1935; 10 to 15 per cent of the persons operated on for cysts died. A similar situation exists in Uruguay, and the infection is commencing in Brazil and Chile.

In his lecture on "Pathology of the Hydatid Cysts of the Lung" Dr. Velarde Pérez Fontana (Uruguay) referred to the new concept of the pathology of the cyst on which a new

surgical procedure has been developed: the extirpation of the adventitious membrane which forms around the cyst. The surgical technic was discussed by Professor Iván Goñi Moreno (Buenos Aires). Only exceptionally should other methods be employed. According to further discussions the method employed in the Institute of Thoracic Surgery in Montevideo (Prof. Ugón) for enucleation of hydatid cyst of the lung consists in making an incision of the adventitia and then using the finger for opening a space so as to draw out the cyst without breaking it. According to the method of Posadas, the cyst is evacuated entirely or with the aspirator of Finochietto, and the bronchi which end in the cavity are closed.

The biologic method of Calcagno (Buenos Aires) consists in injecting hydatid antigen (made from the hydatid liquid and the triturated membranes), which alleviates the symptoms and frequently cures the disease. If the operation is indicated, the previous biologic treatment is all the more desirable. Dr. Pérez Fontana, however, insisted that this biologic method is indicated and satisfactory only when the cyst is broken, while in other cases the surgical method is superior.

GERMANY

(From Our Regular Correspondent)

June 24, 1948.

News from Mainz University

Among the German universities, the University of Mainz has assumed a special role. It is the only university founded by the Occupation Authority (French), and it has been assigned the task of fostering cooperation and fellowship among students from Germany and all other countries. It has introduced the American type of campus life, boarding and housing, a novel feature in German university life.

The university has been largely assisted by the relief program of the Mennonite communities of the United States and Canada, which have organized a student feeding program. About 2,000 students have been receiving two weekly meals of 600 calories, and the program will be enlarged to take in more students.

The university has received a Y.M.C.A. student library consisting mostly of Anglo-American literature. The administration of the library is in the hands of a displaced persons' student union which has been organized at that university.

Dr. Podach, co-worker of the Institute for Medical History of Mainz University, has published a timely article: "The Mortality from Childbed Fever and the Revolution of 1848." He points out: 1848 is known as the year of the German liberal revolution. In medicine, it is also known as the year of the first successes in the fight against childbed fever, after the discovery by Semmelweis that students who carried germs directly from necropsies to the delivery room were mainly responsible for the terrifying Vienna statistics of that time. Chemical and mechanical prophylaxis was introduced and statistics showed a striking improvement immediately thereafter, in 1848. Dr. Podach undertakes to attack the interpretation by Semmelweis of these two facts as cause and consequence, by pointing out that the real reason for this apparent success was more political than medical. Semmelweis himself participated too actively in the revolution to be able to devote much time to clinical work (he gave no obstetrical courses at that time). The students were too busy attending political meetings and fighting on the barricades to work either in pathologic or obstetric departments. Dr. Podach is of the opinion that these facts were more responsible for the excellent statistics of 1848 than the immediate effects of Semmelweis' discovery.

Synthetic Fats for Human Consumption

The production of fats from German-fed animal sources amounted to only 50 per cent of the total requirements of fats for Germany in 1938. To cover the deficit, fat and/or fodder had to be imported. This accounts for the lack of fats in present day Germany. Lately, the daily press has frequently discussed the use of synthetic fats for human consumption. Professional journals too have taken up the issue, the authors drawing different conclusions from their findings.

Prof. Dr. Karl Thomas and Dr. Guenther Weitzel, Leipzig, report in the *Deutsche Medizinische Wochenschrift* about the fitness for human consumption of synthetic fats produced from coal. In the American-licensed *Sueddeutsche Apothekerzeitung* there is a report on the same problem by Dr. Gustav Geist. Dr. A. Krautwald, acting director of the 2nd Medical University Clinic of Berlin, gives a thorough account on the problem in the June 15, 1948 issue of *Das Deutsche Gesundheitswesen*, the official organ of the Health Administration in the Soviet Zone—incidentally the last number which has come through to the American Zone from Berlin since the beginning of the Soviet blockade. Thomas and Weizel report that tests with respect to the tolerability of synthetic fats have shown that an amount of 100 Gm. per day, given for a week, was consumed without any harmful effects, while the consumption of 150 Gm. daily was followed by different disturbances. While natural fats are almost completely metabolized into carbon dioxide and water, synthetic fats leave large amounts of acid waste products, as was proved by urinalyses. Geist, arriving at almost identical chemical results, stresses that consumption over a longer period of time may lead to disturbances, particularly in the kidneys, and also to decalcification of the bones. He concludes that thorough biologic tests will be necessary before synthetic fats are to be released for human consumption. In contrast to this, Krautwald's conclusions read as follows: "The fat examined proved to be highly fit for any dishes requiring fats, and for a paste. Persons in good health could very well digest doses of 100 Gm. per day. The tasty fat causing no detrimental effects or disturbances of health was digested without any trouble even by persons with liver or stomach complaints in quantities up to 50 Gm. per day." In his opinion, it is "urgently necessary to resume the production of synthetic fat and to continue research in that field."

Miscellaneous

A survey about the nutritional situation in the American Sector of Berlin, published in February, showed that a considerable part of the Berlin population is suffering from undernourishment. Qualitatively, the lack of proteins constitutes the most serious problem, while lack of vitamins as such has not led to serious consequences. This is probably due to the fact that, with a low metabolism, the need for vitamins is also lowered.

The *Deutsche Medizinische Rundschau* publishes a report on the tragic situation in Luebeck. There are 90,000 evacuees in that city, and infant mortality has risen to 25 per cent. There are no diapers available, and even the formerly used substitutes, like old maps, pasted on linen, or British food bags, have been used up. Now, old newspapers are used for diapers. The correspondent stresses that such conditions lead not only to an increased infant mortality rate, but also to many maternal deaths owing to increased abortions.

Giessen, the only university in Germany which lacks a medical faculty, will now open an Academy for Medical Research and Training. Part of it will be the former Kaiser Wilhelm Institute for Brain Research, which is now located in Dillenburg, Hesse, and which will be moved to Giessen this year.

At Cologne University, a student group of conscientious objectors was founded. It appeals not only to students opposed to war for moral and religious reasons, but also to those who are "against this scourge of humanity from a purely practical standpoint." Similar students' groups exist in twenty-four different countries, and they are organized in the "International of Objectors to Military Service."

Bureau of Investigation

HOXSEY IN MEXICO

From a Mexican newspaper dated April 12, 1948, comes an item which is translated as follows:

"Like soldiers in their trenches, a veritable army of scientists have begun from their laboratories and experimental clinics a bloody and brave battle against cancer. That fight for humanity under the flag of health has been struggling for liberation for many decades.

"Three soldiers of that army which is combating one of the most tremendous scourges of the human race are in Monterrey living at the Hotel Bermuda they are Dr. Harry M. Hoxsey, Director of the Hoxsey Cancer Clinic in Dallas, Texas, Dr. C. E. Von Hoover of San Antonio, Texas, chemist in the same institution, and the opulent landowner Mr. J. Thomas Hopkins of Longview, Texas, who has been contributing to the work of the great anti-cancer crusade.

Three Generations of Doctors Hoxsey

"During the last decades of the past century, Drs. John Hoxsey Sr. and John Hoxsey Jr., father and grandfather respectfully of Dr. H. M. Hoxsey, have been applying a natural system in treating cancer, which, according to comments of the third of that dynasty of physicians, has nothing to do with surgery or use of radium . . ."

The Hoxsey family genealogy was noted first in THE JOURNAL of Jan. 2, 1926. The ebullient son was considered in an editorial in the March 15, 1947, issue of THE JOURNAL.

Accompanying this Mexican newspaper article were copies of two letters sent by Hoxsey in support of his treatment. They are signed by "C. E. Von Hoover, Ph.D., Consulting Chemist-Pharmacologist." One, dated Dec. 11, 1947, to the Hoxsey Cancer Clinic, Dallas, Texas, is entitled "Tests Hoxsey Cancer (Internal) Treatment." The chemist has found, as the essentials of such treatment, the following:

"This preparation contains and is found in the analysis—a most of special type of scientifically and specially prepared Iodine, as well as in the same perfected manner is found Osmunda regalis facto (alkaloid free), which creates by mixing the above two ingredients, V. Conservatrix and Conium 1x, the first and later are indicated for the treatment of carcinoma and cancerous tumors by the Homeopathic Materia Medica (Ref. Luyties M. M. Page 150 Carcinoma). This is created and formed because the preparation contains no metals; therefore, it is—in my opinion a valuable chemotherapeutic

"Among other elements noticed in this preparation are traces of colloidal gold The preparation is COLLOIDAL, a gold mixture creating another element therapeutic agent."

The next sentence is rather staggering. It constitutes a broad indictment of the medical profession and its abilities when it comes to the matter of the mixing of drugs

"The outstanding results obtained in the treatment of carcinoma by physicians who prescribe same are no doubt due to the great therapeutic value produced by the mixture of the special ingredients and the secret process of mixture; since this preparation is mixed by a physician, therefore, we are not in position as to find by study and analysis the method used."

The copy of the second letter is dated Dec. 14, 1947, and says:

"Research reveals that the outstanding therapeutic values you receive in the treatment of all types of carcinoma, in addition to other reports submitted you by the writer, is due to the fact that the 'crossing' of the drug ingredients contained in Hoxsey treatment, produces because of same, by reason of: a reaction chain which the fluorescent substances serve as a group of reactants, producing the carrier and producing by-product values. The by-products are 'end' products, are produced by the ingredient mixtures contained in the preparation, thereby creating a virus destroying agent, in this way Calcaria Fluorica of homeopathy proved useful in cancer

"Physicians using this preparation should bear in mind that sometimes we of the scientific 'galleys' can not explain in a professional or any other language why simple mixture of simple drugs produce startling therapeutic values; when they do and are safe in administration, results are all that is necessary.

"You, Dr. Durkee, are the best reference that the preparation has, for the reasons that under your direction you have witnessed the results; in my opinion, the results are due to my above and other explanation in my reports to you.

"I have spent much time in analysis, research and works of almost every nature with this product. It becomes interesting at all times, the more you look into same, the more interesting matters come to light."

The second letter was addressed to Dr. J. B. Durkee, the medical director of the Hoxsey Cancer Clinic, an osteopath. An article of his appeared in a recent issue of the *Journal of the National Medical Society*. The article is prefaced by an editor's note which says of the use of the Hoxsey treatment that the American Medical Association "had their chance and they arrogantly and stupidly rejected it."

Well! An editor is known by the articles he publishes!

Medical Motion Pictures

FILM REVIEWS

The Role of Gastroscopy in the Diagnosis and Treatment of Gastric Pathology. 16 mm., color, sound, 1,200 feet (one reel), showing time thirty-three minutes. Prepared by Leo L. Hardt, M.D., Department of Medicine, Loyola University School of Medicine, Chicago. Produced in 1947 by Jam Handy Organization, Chicago. Procurable on loan from Harrower Laboratory, 5 South Wabash Avenue, Chicago.

This film presents gastroscopy and its place in the diagnosis of gastric disease in an informative manner. Following a brief historical introduction, it shows the development of the modern flexible gastroscope. The indications and contraindications for gastroscopy are clearly defined and evaluated. By appropriate models, roentgenograms and other illustrative material the film clearly depicts the lesions which may be differentiated by gastroscopy. Notable is the emphasis given to close cooperation between the gastroscopist and roentgenologist in diagnosis of gastric lesions Clearly shown are the advantages and disadvantages of each diagnostic procedure, and emphasis is made on the proper integration of these diagnostic aids.

The last part of the film deals with the evaluation of various gastric antacids by gastroscopy. This is perhaps the least educational portion of the film, since there appears to be some bias in favor of a particular mixture However, the technic of evaluation is interesting and instructive. The film appears suitable for teaching medical students and for presentation to a general medical audience. The photography is excellent, but the narration is poor.

Substitution Transfusion In The Treatment Of Erythroblastosis Fetalis. 16 mm., color, silent, 800 feet (one reel), showing time thirty minutes. Prepared in 1947 by and procurable on loan from Harry Wallerstein, M.D., Director, Erythroblastosis Fetalis Clinic, Jewish Memorial Hospital, and the Department of Hematology, Morrisania City Hospital and Queens General Hospital, New York.

The film presents substitution transfusion in the treatment of erythroblastosis fetalis. The three technics used for the removal of the infant's blood are shown, namely, the longitudinal sinus, the umbilical vein and the radial artery. Each procedure is depicted in detail; this will aid the surgeon greatly in learning the methods. The criteria for selection of cases

are given. The author seems rather confident that the operation will prevent development of kernicterus. Calcium gluconate is administered to counteract the large amounts of sodium citrate. Would it not be advisable to give it in divided doses instead of only at the completion of the procedure? Obstetricians and pediatricians may object to too much exposure of the baby during the fairly long procedure. The surgeon will wonder why a local anesthetic was not used for the venesection. Many would like to know how long each operation takes in an average case.

The author used excellent judgment in the choice of material in his emphasis on particulars and in selection and formulation of descriptive matter. This film can be recommended to all those interested in the treatment of erythroblastosis fetalis. The mortality rate as given in the final statistical summary understates the true mortality among the treated infants; the rate of 2 per cent was computed from the total of 62 treated and untreated infants, yet the rate is referred to as being based on infants treated according to plan.

MEDICAL MOTION PICTURE REVIEW

First Steps. 16 mm., black and white, sound, 375 feet, showing time ten minutes. Prepared under the supervision of the Department of Public Information of the United Nations with medical supervision by N. Purshotton, M.D., India. Produced in 1947 by Frederic House, New York. Procurable on rental from: Film Program Services, 1173 Avenue of the Americas, New York 19.

This is a documentary film on the rehabilitation of children afflicted with poliomyelitis and cerebral palsy. Taken in a rehabilitation camp for the orthopedically handicapped child, an excellent series of sequences shows the methods of training disabled children to walk again and to become useful citizens. The film stresses the concept that "since the child himself is developed, as well as his legs, walking is a beginning and not an end."

This film was originally planned to be used primarily for child welfare work in India; thus the term "social worker" is used throughout, whereas the Western World would more correctly use the words "physical therapist."

The film has dramatic appeal, and the filming and sound track are superlative; it will interest physicians, physical therapists, occupational therapists, social workers, lay groups who are concerned with the welfare of the crippled child and parents of handicapped children.

PUBLIC HEALTH SERVICE FILMS

The following 35 mm., sound, black and white film strips with records have recently been released by the United States Public Health Service, Communicable Disease Center, Atlanta 3.

Laboratory Diagnosis of Rabies emphasizes that laboratory diagnosis of rabies depends on the ability of the laboratory technicians to determine the presence or absence of Negri bodies. Photographs of the Negri bodies will accompany the film strip. (Running time eight minutes.)

The Fight Against Rabies is intended to eliminate rabies through close cooperation of citizens with local, state and federal authorities engaged in a national eradication program. (Running time fourteen minutes.)

Spread and Prevention of Trichinosis discusses symptoms, life cycle of Trichinella Spiralis, statistical analysis in relation to incidence of the disease and means of prevention. Suitable for showing to subtechnical audiences and is related to the film strip entitled "Worms in Your Muscles." (Running time twelve minutes.)

Worms in Your Muscles depicts the life cycle of the Trichinae, the symptoms and prevention of the disease. Suitable for showing to technical audiences and is related to the film strip entitled "Spread and Prevention of Trichinosis." (Running time ten minutes.)

These film strips are procurable on a short term loan (thirty days) through the following address: Medical Director in Charge, Communicable Disease Center, 605 Volunteer Building, Atlanta 3, Ga., Attn: Film Library.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and the Examining Boards in Specialties were published in THE JOURNAL, July 17, page 1081.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: *Examination.* Montgomery, June 28-30, 1949. Sec., Dr. D. G. Gill, 519 Dexter Ave., Montgomery.

ALASKA: * *Examination.* Juneau, Sept. 7. Sec., Dr. W. M. Whitehead, Box 140, Juneau.

CALIFORNIA: *Oral.* Los Angeles, Aug. 7-8. *Written.* Los Angeles, Aug. 9-12; Sacramento, Oct. 18-21. Sec., Dr. Frederick N. Scatena, 1020 N. Street, Sacramento 14.

CONNECTICUT: * *Examination.* Hartford, Nov. 9-10 Sec., Dr. Creighton Barker, 258 Church St., New Haven.

DISTRICT OF COLUMBIA: * *Reciprocity.* Washington, Sept. 13. Sec., Commission on Licensure, Dr. G. C. Ruhland, 4130 Municipal Bldg., Washington, D. C.

GEORGIA: *Examination.* Atlanta, Oct. 12-13. *Endorsement.* Atlanta, Oct. 14. Sec., Mr. R. C. Coleman, 111 State Capitol, Atlanta.

ILLINOIS: Chicago, Oct. 5-7. Supt., Dept. of Registration and Education, Mr. Fred W. Ruegg, Capitol Bldg., Springfield.

IOWA: * *Examination.* Des Moines, Dec. 6-8. *Endorsement.* Des Moines, Aug. 2. Sec., Dr. M. A. Royal, 506 Fleming Bldg., Des Moines.

MAINE: Portland, Nov. 9-10. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Examination.* Baltimore, Dec. 14-17. *Endorsement.* At the discretion of the Board. Sec., Dr. Lewis P. Gundry, 1215 Cathedral St., Baltimore.

MINNESOTA: Minneapolis, Oct. 19-21. Sec., Dr. J. F. DuBois, 230 Lowry Medical Arts Bldg., St. Paul 2.

MISSOURI: Jefferson City, Aug. 8. Exec. Sec., Mr. J. A. Hailey, Room 135 Capitol Bldg., Jefferson City.

MONTANA: Helena, Oct. 4-6. Sec., Dr. O. G. Klein, First Nat'l Bank Bldg., Helena.

NEVADA: Carson City, Nov. 1. Sec., Dr. G. H. Ross, Industrial Bldg., Carson City.

NEW HAMPSHIRE: Concord, Sept. 9. Sec., Board of Registration in Medicine, Dr. J. S. Wheeler, Room 107, State House, Concord.

NEW MEXICO: * Santa Fe, Oct. 11-12. Sec., Dr. V. E. Berchtold, 141 Palace Ave., Santa Fe.

NEW YORK: *Examination.* Various Centers, Sept. 27-30. Sec., Dr. J. L. Lochner, Jr., 23 South Pearl St., Albany 7.

OHIO: *Examination.* Columbus, Dec. *Endorsement.* Columbus, Aug. 9, Oct. 5. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

PENNSYLVANIA: *Examination.* Philadelphia, Jan., 1949. Act. Sec., Mrs. M. G. Steiner, 351 Education Bldg., Harrisburg.

RHODE ISLAND: * *Examination.* Providence, Oct. 7-8. Chief, Div. of Professional Regulation, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH CAROLINA: *Endorsement.* Aug. 2, Sept. 6. Sec., Dr. N. B. Heyward, 1329 Blanding St., Columbia.

WEST VIRGINIA: Charleston, Oct. 4-6. Sec. Public Health Council, Dr. N. H. Dyer, State Dept. of Health, Charleston.

WISCONSIN: * Madison, Jan. 11-13, 1949. Sec., Dr. C. A. Dawson, Tremont Bldg., River Falls, Wis.

WYOMING: *Examination.* Cheyenne, Oct. 4. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ALASKA: Juneau. Last week in Aug. Sec., Dr. C. Earl Albrecht, Box 1931, Juneau.

ARIZONA: *Examination.* Tucson, Sept. 21. Sec., Mr. Francis A. Roy, Univ. of Arizona, Tucson.

COLORADO: *Examination.* Denver, Sept. 15-16. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver 3.

DISTRICT OF COLUMBIA: *Examination.* Washington, Oct. 18-19. Sec., Dr. G. C. Ruhland, 4130 Municipal Bldg., Washington, D. C.

FLORIDA: *Examination.* Gainesville, Nov. 6. Final date for filing application is Oct. 25. Mr. M. W. Emmel, University of Florida, Gainesville.

IOWA: Des Moines, July 13, Oct. 12. Sec., Dr. Ben H. Peterson, Coe College, Cedar Rapids.

MICHIGAN: *Examination.* Ann Arbor and Detroit, Oct. 8-9. Sec., Miss Eloise LeBeau, 1510 West Allegan St., Lansing.

MINNESOTA: *Examination.* Oct. 5-6. Sec.-Treas., Dr. Raymond N. Bieter, 105 Millard Hall, Univ. of Minnesota, Minneapolis.

NEBRASKA: *Examination.* Omaha, Oct. 5-6. Dir., Bureau of Examining Boards, Mr. Oscar F. Humble, Room 1009 State Capitol Bldg., Lincoln.

NEW MEXICO: *Examination.* Santa Fe, Aug. 1. Sec., Miss Marguerite Kilkenny, P. O. Box 307, Santa Fe.

OKLAHOMA: Spring of 1949. Sec., Dr. Clinton Gallaher, 813 Braniff Bldg., Oklahoma City.

OREGON: *Examination.* Portland, Sept. 4. Sec., Basic Science Examining Committee, Dr. C. D. Byrne, Univ. of Oregon, Eugene.

RHODE ISLAND: *Examination.* Providence, Aug. 11. Chief, Div. of Professional Regulation, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH DAKOTA: *Examination.* Vermillion, Dec. 3-4. Sec., Dr. G. M. Evans, Yankton.

TENNESSEE: *Examination.* Memphis & Nashville, Sept. 20-21. Sec., Dr. O. W. Hyman, 874 Union Ave., Memphis.

WISCONSIN: *Examination.* Madison, Sept. 25. Final date for filing application is Sept. 18. Sec., Prof. W. H. Barber, Scott & Watson Sts., Ripon.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Nurses: Right of Physician to Procure Dismissal from Case.—The plaintiff filed a suit for damages against the defendant physician for having "procured" the hospital authorities to dismiss her from a case and to prohibit her from being called as a special nurse at the hospital. The jury found for the plaintiff, but the trial court entered a verdict for the defendant. The plaintiff, therefore, appealed to the Supreme Judicial Court of Massachusetts.

The plaintiff testified that in 1936, while doing special nursing in the hospital, her patient was annoyed by a patient of the defendant continuously ringing the bell. The plaintiff asked the defendant's patient to give short rings instead. The next day the defendant demanded that the plaintiff apologize to his patient, which the plaintiff did. On that occasion the defendant said, "I will get you off . . . registry if it is the last thing I do." He was "very very mad." He told the plaintiff to have "nothing to say or do" to him or his patients, so from that time on the plaintiff and the defendant never spoke to each other. On Oct. 21, 1941, the plaintiff was caring for a patient at the hospital and a patient of the defendant was in the same room. One evening, after visiting hours were over, the plaintiff, desiring to give some needed attention to her patient, requested another nurse to remind some persons then visiting the defendant's patient that it was after visiting hours. The defendant's patient became excited about this. Two days later the superintendent of the hospital (who had direct charge of the care of patients and of nurses and had jurisdiction over the plaintiff) called the plaintiff on the telephone and said, "I am omitting you from your case . . . . Dr. Williams wants to talk with you." The defendant, then taking the telephone, "yelled" at the plaintiff, "Why did you tell my patient I was only worth two cents?" The plaintiff denied having told that to the patient. The defendant said, "And why did you tell my patient's visitors to leave?" After more words, the defendant said, "I have told . . . [the superintendent] that you are never to work in this hospital again and that if you come back here to work I will never send another patient here. I have told her it is either you or me. There is not room enough here for both of us." The plaintiff said, "Dr. Williams, you have no right to talk to me like that, or have me taken off the registry." He replied, "It isn't a matter of what I have a right to do, it is what I have done." Later the superintendent said to the plaintiff that the defendant was a very important man in the hospital, that he had said that if the plaintiff were put back on the list he would never send another patient to the hospital, that the superintendent was not a free agent in the matter and that the plaintiff could not go back on the list until she had seen the defendant and fixed it up with him and placated him. The plaintiff said she could not do that. No witness testified that the plaintiff in fact did make the derogatory remarks mentioned, and she testified in effect that she did not.

The defendant's position, supported by his testimony, was, in substance, that he was conscious of no ill will against the plaintiff until she brought this action, that he simply reported to the superintendent what his patient had told him as to the conduct and language of the plaintiff, which in his opinion were a breach of ethics, that he did not request the superintendent to omit the plaintiff or to take her name off the list and that the superintendent acted on her own initiative. He denied having made most of the statements attributed to him by the plaintiff.

The only question, said the court, was whether or not the evidence warranted a verdict for the plaintiff. If the jury believed the evidence most favorable to the plaintiff, they could find that having her name on the hospital's list of nurses and the privilege of nursing at the hospital were business relationships valuable to the plaintiff in that they afforded her a fairly reasonable means of access to employment in her profession. They could find that these valuable relationships would have continued, if it had not been for the persuasion and influence of the defendant. They could find that in 1936 the defendant threatened to get the plaintiff off the registry of the hospital and that in 1941 he practically commanded the superintendent to dismiss the plaintiff on the threat to bring no more patients to the hospital if she did not do so and that the superintendent acted as she did in consequence of that threat. They could find that the defendant's conduct was purposely directed toward securing the dismissal of the plaintiff from the hospital, with full knowledge of the consequences to her, and that it was successful in bringing about that result.

The governing principle of law, said the Supreme Court, is set forth in Restatement, Torts, Section 766, in these words, ". . . one who, without a privilege to do so, induces or otherwise purposely causes a third person not to . . . enter into or continue a business relation with another is liable to the other for the harm caused thereby." Our own decisions, the court continued, appear to be in accord with this statement, and in order to maintain the action it is not necessary that the plaintiff prove that she had a binding contract with the hospital. It is well settled that an existing or even a probable future business relationship from which there is a reasonable expectancy of financial benefit is enough. The next inquiry is therefore whether a privileged occasion existed on which the defendant could rely as justification for knowingly and intentionally causing damage to the plaintiff. We assume, said the court, that if the plaintiff did disparage the defendant to his own patient a privileged occasion would arise which would justify the defendant in doing something in relation to the matter for the purpose of maintaining necessary discipline in the hospital and efficient working relations between nurses and physicians. A privileged occasion of some sort might perhaps arise if the defendant had been credibly informed and believed that the plaintiff had made the statements attributed to her, even if in fact she had not made them. We do not decide these questions. The difficulty with the defense is that the plaintiff did not admit either having made the statements or that the defendant had been informed that she had made them. Although no witness testified to the actual making of the statements, there was much evidence that the defendant had been informed that they were made. But none of this evidence bound the plaintiff. The jury could have disbelieved *in toto* the evidence tending to show a privileged occasion. Since the jury were not obliged to believe that any privileged occasion existed, they could have found for the plaintiff on the ground that the defendant's injury to the plaintiff remained wholly unjustified. The conclusion is unescapable, said the Supreme Court, that this was a jury case. Accordingly the verdict of the trial court, which was contrary to the jury's finding, was set aside and the verdict of the jury reinstated. *Owen v. Williams, 77 N.E. (2d) 318 (Mass., 1948).*

Charitable Hospitals: Liability for Injuries to Patient Falling Out of Bed.—The plaintiff sued for damages for injuries sustained while a patient in the defendant hospital. From a judgment for the plaintiff the defendant appealed to the supreme court, appellate division, third department.

The plaintiff, an infant slightly over 2 years of age, had a generalized eczema over his head and body, with swollen glands in his neck and behind his ears. He was running a temperature of more than 103 F. when taken to the defendant hospital, as a paying patient, and placed in a crib, the top of which was 57¼ inches from the floor and 25 inches from the upper side of the mattress. Three days later the child climbed over the side of the crib and fell to the floor, receiving the injuries forming the basis for this suit.

Pointing up the question of the liability of a charitable hospital, the court quoted a prior New York case as follows: "Certain principles of law governing the rights and duties of hospitals, when maintained as charitable institutions, have, after much discussion, become no longer doubtful. It is the settled rule that such a hospital is not liable for the negligence of its physicians and nurses in the treatment of patients. . . . This exemption has been placed upon two grounds. . . . The second ground of the exemption is the relation subsisting between a hospital and the physicians who serve it. It is said that this relation is not one of master and servant, but that the physician occupies the position, so to speak, of an independent

contractor, following a separate calling, liable, of course, for his own wrongs to the patient whom he undertakes to serve, but involving the hospital in no liability, if due care has been taken in his selection. . . . It is true, I think, of nurses, as of physicians, that, in treating a patient, they are not acting as the servants of the hospital. The superintendent is a servant of the hospital; the assistant superintendent, the orderlies, and the other members of the administrative staff are servants of the hospital. But nurses are employed to carry out the orders of the physicians, to whose authority they are subject. The hospital undertakes to procure for the patient the services of a nurse. It does not undertake, through the agency of nurses, to render those services itself."

Applying these principles to the facts of the present case, the court was of the opinion that the evidence did not warrant the finding that a professional determination had been made by the receiving nurse or any other nurse or physician that additional restraint was necessary, thus making the failure to apply such paraphernalia an administrative act for which the defendant was chargeable. Accordingly the judgment in favor of the plaintiff was reversed. *Pierson v. Charles M. Wilson Memorial Hospital, 78 N. Y. S. (2d) 146 (N. Y., 1948).*

Naturopathy as Practice of Medicne.—The defendant was convicted of unlawfully practicing medicine and surgery without a license so he appealed to the Court of Appeals of Ohio, Franklin County.

A witness for the prosecution testified that she went to the defendant's office suffering from a pain in her leg and was first examined by a Mr. Good in the defendant's office, after which she was in consultation with both the defendant and Mr. Good. The defendant told her that her glands did not function properly, prescribed thyroid tablets, a box of capsules and several other different kinds of medicine and injected oxygen into her leg by means of a hypodermic needle. She said that the defendant prescribed the medicine for her and that she paid him $10 for the examination and that the medicine was $16. The defendant admitted giving her the oxygen treatment and also admitted that all of the office equipment belonged to him and that all money received from patients was turned over to him. It was also admitted that the defendant was not licensed by the State of Ohio.

The statutes of Ohio provide: "A person shall be regarded as practicing medicine, surgery or midwifery, within the meaning of this chapter . . . who examines or diagnoses for a fee or compensation of any kind or prescribes, advises, recommends, administers or dispenses for a fee or compensation of any kind, direct or indirect, a drug or medicine, appliance, application, operation or treatment of whatever nature for the cure or relief of a wound, fracture or bodily injury, infirmity or disease. . . ."

The defendant contended that he was practicing naturopathy and that naturopathy is not medicine or any of its branches within the purview of the above quoted statute. We are not interested in what name or title the defendant gives to his profession, said the court of appeals, but we are only interested in whether or not what he did constituted the practicing of medicine as defined by the statute. There is testimony in the record to the effect that he examined, prescribed and dispensed for a fee certain medicines and that he gave a treatment by means of the oxygen needle. The defendant contended that what he gave to Mrs. Linn was neither a drug nor a medicine. Winston's Universal Reference Library, said the court, defines medicine as being "any drug or remedy for the treatment and cure of disease." Medicine, therefore, is not only a drug but is also a remedy. The statute may be violated by the dispensing of a remedy as well as a drug. On one of the state's exhibits received by the witness at the defendant's office, we find the warning: "To be used only by or on the advice of a doctor." On another we find: "Active ingredient thyroid. To be used only by or on the prescription of a physician. It is not safe to take thyroid except under the supervision of a physician." We are therefore of the opinion, the court concluded, that there was ample evidence in the record to support the verdict of the jury and it is not against the manifest weight of the evidence. Accordingly, the judgment of conviction was affirmed.—*State v. Henning, 78 N. E. (2d) 588 (Ohio, 1948).*

Employers Duty to Notify Employee of Results of Physical Examination by Company Doctor.—The plaintiff sued his employer and a fellow employee for damages sustained, as a result of an injury during the course of his employment, by reason of the negligence of the fellow employee. From a judgment for the plaintiff, the defendants appealed to the Supreme Court of Oklahoma.

The evidence showed that, in April 1942, one of the toes of the plaintiff's left foot became infected. Subsequent hospitalization at the railroad hospital revealed that the plaintiff was afflicted with Buerger's disease (thromboangiitis obliterans), a disease which causes the blood vessels in the extremities to be obstructed. When blood cannot reach the toes or other afflicted parts, gangrene sets in and amputations become necessary to prevent further spread of the disease. The plaintiff received treatment for his left foot until July, when his left great toe was amputated. He returned to work in January 1943, as a section hand, and continued in such employment until April. At some time during that period he was lifting a tie with a fellow employee. His co-worker jerked or dropped the tie, causing the plaintiff to fall into a trench and strike his right ankle on a big cinder. He was given treatment for the resulting infection in his right ankle from April to August, when he went to the company hospital again and, in December, underwent amputation of his right leg. The infection and subsequent amputation of the right leg was due to the fact that he was afflicted with Buerger's disease. The plaintiff's evidence indicated that he at no time knew or was told that he had Buerger's disease and at no time was warned of any dangers or unusual perils which might befall him because of this affliction. He contended, however, that the employer knew that he was so afflicted and that it was therefore negligent in permitting him to return to work as a section hand when it knew that it was hazardous to employ him at work in which he might receive a blow or bruise which might, or probably would, cause an aggravation of the disease, resulting in a gangrenous condition and possible amputation of the afflicted portion of the plaintiff's body. The plaintiff also contended that the employer was negligent in failing to inform him of his condition.

The employer's principal contention was that the duty rests on the servant to determine for himself whether or not he has sufficient health and strength to perform the duties of a position and not on the master. This rule, said the Supreme Court, is based on knowledge or presumed knowledge on the part of the servant and is inapplicable to the case at bar. The right to recovery in this case is based on positive lack of knowledge by the servant of his affliction and therefore lack of knowledge of exposure to greater dangers than the work necessarily entailed.

The employer also contended that the instructions were erroneous, in that they failed to place on the plaintiff the burden of proving that the defendant employer knew that the plaintiff was ignorant of having the disease and the probable effect thereof. According to the undisputed evidence, the court said, the plaintiff was afflicted with a rare disease not commonly known or recognized, difficult of diagnosis and discovery and unusual in its nature; the plaintiff received no treatment at any time except from the defendant company physician or physicians in communication with the defendant company. The instructions given placed the burden on the plaintiff of proving not only that the physicians discovered the disease but that they did not at any time tell him of his condition or the nature and characteristics of the affliction and that he did not receive such knowledge from any source. According to the undisputed facts in this case, the court concluded, the instruction given in effect required the plaintiff to establish that the employer knew him to be ignorant of his condition, and the jury resolved this question in favor of the plaintiff.

In conclusion, the Supreme Court held that the instructions correctly stated the issues presented by the pleadings and the evidence and correctly stated the law applicable thereto and, further, that there was competent evidence reasonably tending to support the verdict of the jury. The judgment in favor of the plaintiff was accordingly affirmed. *Atchison, T. & S.F. Ry. Co. v. Perryman, 192 P. (2d) 670 (Okla., 1948).*

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1937 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied with stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Heart Journal, St. Louis

35:369-528 (March) 1948

*Effect of Occlusive Arterial Diseases of Extremities on Blood Supply of Nerves. Experimental and Clinical Studies on Role of Vasa Nervorum. J. T. Roberts, W. H. Jarvis, R. S. Browne and others. -p. 369.

*Experience with Three Vascular Fragility Tests in Hypertension. J. Schweppe, H. A. Lindberg and M. H. Barker. -p. 393.

*Night Cramps in Human Extremities: Clinical Study of Physiologic Action of Quinine and Prostigmine upon Spontaneous Contractions of Resting Muscles. H. K. Moss and L. G. Herrmann. -p. 403.

Relation Between Arterial Pressure and Blood Flow in Foot. P. Scheinberg, E. W. Dennis, R. L. Robertson and E. A. Stead Jr. -p. 409.

Electrocardiogram in Chronic Cor Pulmonale. R. Zuckermann, E. Cabrera C., B. L. Fishleder and D. Sodi-Pallares. -p. 421.

Familial Incidence of Rheumatic Fever: I. Discussion of Relationship Between Positive Family History and Development of Rheumatic Fever in Individuals of Military Age. G. C. Griffith, F. J. Moore, S. McGinn and R. S. Cosby. -p. 438.

Id.: II. Statistical Study of Familial and Personal History of Rheumatic Fever. G. C. Griffith, F. J. Moore, S. McGinn and R. S. Cosby. -p. 444.

Different Mechanisms of Fusion Beats. M. R. Malinow and R. Langendorf. -p. 448.

Glossopharyngeal Neuralgia: Cause of Cardiac Arrest. B. S. Ray and H. J. Stewart. -p. 458.

Diminished Efficiency and Altered Dynamics of Respiration in Experimental Pulmonary Congestion. H. E. Heyer, J. Holman and G. T. Shires. -p. 463.

Prolongation of Q-T Interval in Electrocardiogram Occurring as Temporary Functional Disturbance in Healthy Persons. With Proposal That (Q-T) Cal. May be Used to Designate Q-T Intervals Calculated for Physiologic Variables, Cycle Length, Age and Sex. O. Horwitz and A. Graybiel. -p. 480.

Effect of Occlusive Diseases on Blood Supply of Nerves.—According to Roberts and associates the blood supply of peripheral nerves has received little attention in connection with clinical problems since it is common belief that the metabolism of a peripheral nerve depends on the cell bodies of its neurones rather than on the nourishment of its axones. The author's studies indicated that ischemic nerves suffered changes in function and structure. Experiments consisted of interference with the blood supply of peripheral nerves in various ways. Clinical cases were collected where the influence of ischemia on a peripheral nerve could be demonstrated by dissection and injection. The blood supply of nerves has been shown to be abundant. This blood supply was obliterated by ligating nutrient arteries of a nerve, by stripping off the epineurium, by compressing a nerve or stretching it and by injecting embolic substances into a nutrient artery. Having produced ischemia of the nerve by these methods, it was studied by injecting dye through the aorta into the vasa nervorum and was found to alter the function and structure of the nerve. Peripheral nerves of man may be made ischemic by similar processes and by proliferative, vasospastic or thromboembolic vascular diseases affecting either arterial or venous blood supply of the nerves in a great variety of clinical conditions (for example, diabetes mellitus, thromboangiitis obliterans, arteriosclerosis, arterial embolism and thrombosis, phlebothrombosis, stretching or compression of nerves, anemia or hemoconcentration). Sensory and motor changes were closely correlated with ischemia of nerves in the cases studied by injecting dye or by sections. Crossing the legs, sleeping or sitting in a position that causes compression or stretching of nerves, and the use of constricting clothing or vasospastic drugs like tobacco should be avoided by patients with ischemia of limbs. Tingling, numbness and similar mild complaints may indicate early stages of ischemic neuropathy and may therefore be signs of serious import. Benefit may follow vasodilation and correction of causal factors.

Vascular Fragility Tests in Hypertension.—Schweppe and his associates attempted to evaluate the three capillary fragility tests, the Gothlin, the negative pressure and the cuff trauma test. None of the tests adequately fulfils the need for an accurate quantitative test. Abnormal capillary fragility was found in 15.9 per cent of 44 hypertensive patients. Thiocyanates did not increase capillary fragility in this particular series. Rutin, administered in 180 mg. doses daily, reduced the susceptibility to capillary hemorrhage in 3 patients. In 3 the results were questionable. Abnormal capillary fragility was associated with advanced diffuse degenerative arteriosclerosis in most of the cases that were investigated.

Night Cramps in Human Extremities.—Moss and Herrmann present observations on 20 patients with nocturnal muscle cramps. Night cramps seem to result from the action of some end product of metabolism, as in diabetes, or from poor elimination of normal end products of muscle metabolism, as in patients with venous stasis due to varicose veins or pregnancy, or following deep venous occlusion. Increased muscular activity favors the development of night cramps during the rest which follows such activity. No relationship exists between intermittent claudication and muscle cramps at rest. Quinine sulfate has been found to give prompt relief of night cramps in extremities. Evidence indicates that the action of quinine is directly on muscle, rather than on the myoneural junction. Quinine sulfate produces a refractory period in skeletal muscle that is similar to the refractory period in heart muscle.

American Journal of Medicine, New York

4:313-389 (March) 1948

*Endocrine Changes Associated with Laennec's Cirrhosis in Liver. C.W. Lloyd and R.H. Williams. -p. 315.

*Complications of Alkalosis. W.J. Grace and D.P. Barr. -p. 331.

*Electrolyte Partition in Patients with Edema of Various Origins: Sodium and Chloride, Edith B. Farnsworth. -p. 339.

Serum Concentrations of Penicillin G in Man Following Intramuscular Injection in Aqueous Solution and in Peanut Oil-Beeswax Suspension. H.A. Tucker and H. Eagle. -p. 343.

Streptomycin: Clinical Study of Its Use in Twenty-Six Cases. W.S. Priest and J.B. O'Neill. -p. 355.

Clinical Studies in Use of Myanesin. E.B. Schlesinger, A.L. Drew and Barbara Wood. -p. 365.

Correlation Between Effect of Quinidine Sulfate on Heart and its Concentration in Blood Plasma. R. Wegria and Margaret N. Boule. -p. 373.

Clinical Evaluation of Treatment of Pneumococcic Type III Pneumonia. M.F. Collen and R.L. Dobson. -p. 383.

Endocrine Changes in Cirrhosis of Liver.—Lloyd and Williams studied the endocrine functions in 71 patients with cirrhosis of the liver. Fifty-five of the subjects were men and 16 were women. Decrease in libido and potentia were found in 37 of the 52 men, who could be questioned in this respect. Decrease in the axillary hair growth was present in 46 of 55 male patients. Testicular atrophy was present in 36 of 50 men. Gynecomastia was present in 23 of 55 men. The women with hepatic cirrhosis had alteration in the menstrual pattern, in sexual drive, in body hair, in the uterus and in other target organs of estrogen, including the breast. Reviewing the results of postmortem examinations on 87 patients with Laennec's cirrhosis who were examined at the Mallory Institute of Pathology, the authors say that almost all had a decrease in the liquid content of the adrenals and in 8 of 23 patients there was atrophy of the testes.

Complications of Alkalosis.—Grace and Barr call attention to the fact that the use of gastric suction and sodium lactate solutions may lead to alkalosis which may be accompanied by changes in personality, delirium, stupor or convulsions and by renal insufficiency which tends to persist. The state is often unrecognized and if neglected may lead to serious consequences. The authors present the histories of 9 patients, of whom 6 exhibited both delirium and renal insufficiency, 2 showed delirium only and 1 had renal insufficiency without mental disturbance. Primary conditions included subtotal pancreatectomy, intestinal obstruction, cancer of the colon and peptic ulcer. Three of 4 patients with peptic ulcer were also emphysematous. It seems that emphysematous patients are more than ordinarily susceptible to alkaline therapy. In 2 of the emphysematous patients with peptic ulcer, the administration of Sippy powders or similar alkaline treatment seemed to be the exciting cause. The alkalosis may correct itself if the cause can be removed. In several patients spontaneous remission occurred when the alkaline powders were withdrawn or the gastric suction and parenteral administration of lactate solution were discontinued. In others it appeared necessary to administer autoclaved 2 per cent solution of ammonium chloride in distilled water. The usual procedure was to administer a liter of such a solution (20 Gm. ammonium chloride) over a period of two and one half to three hours. The results were satisfactory and frequently dramatic, with almost immediate improvement in the orientation and cooperation of the patient as well as rapid disappearance of the disturbing symptoms.

Electrolytes in Edema.—Farnsworth collected data on electrolyte partitions in the urine of patients with congestive heart failure, hepatic cirrhosis and nephrosis for the purpose of demonstrating renal function in fluid retention associated with these entities. Clearance evaluation of sodium and chloride in cardiac decompensation and in normal subjects showed a decrease in sodium clearance with respect to chloride in the cardiac group. Comparison of sodium to chloride in milliequivalent ratios showed a constant decrease in sodium excretion and a depression in the sodium-chloride ratio. This depression varied directly with the severity of the disease process and the degree of fluid retention. These results are compatible with the hypothesis that edema is a result of retention of sodium by the renal tubules rather than of increased venous pressure. Patients with hepatic cirrhosis were found to release greatly reduced amounts of sodium; several showed only traces. In this group the sodium-chloride ratio was even more sharply reduced than in the cardiac group. Such evidence of pathologic physiology in the kidney is difficult to reconcile with the widely held theory that fluid retention in cirrhosis is inversely proportional to the plasma albumin concentration. No disturbance in the normal sodium-chloride ratio could be found in 9 patients with nephrosis. It was concluded that fluid retention in cardiac decompensation and in hepatic cirrhosis is not due solely to increased hydrostatic and decreased oncotic pressure, respectively, but to disturbance of electrolyte metabolism intimately associated with the renal tubules. Thus the kidney seems to play an active role in the establishment and maintenance of certain types of fluid retention.

American Journal of Pathology, Ann Arbor, Mich.

24: 235-450 (March) 1948

Pathology of Secondary Shock. V. H. Moon. -p. 235.
Studies on Mechanism of Action of Nitrogen and Sulfur Mustards in Vivo. D. A. Karnofsky, I. Graef and H. W. Smith. -p. 275.
Histologic Studies on Virilizing Tumor of Adrenal Cortex. E. J. Weber and Maud L. Menten. -p. 293.
*Tumors of Carotid Body. P. M. LeCompte. -p. 305.
Paracoccidioidal Granulomatosis: Cardiac Localization in Case of Generalized Form. L. da Cunha Motta. -p. 323.
Systemic North American Blastomycosis: Report of Case with Cultural Studies of Etiologic Agent and Observations on Effect of Streptomycin and Penicillin in Vitro. M. L. Littman, E. H. Wicker and A. S. Warren. -p. 339.
Persistent "Insect Bites" (Dermal Eosinophilic Granulomas) Simulating Lymphoblastomas, Histiocytoses, and Squamous Cell Carcinomas. A. C. Allen. -p. 367.
Allergic Hyperglobulinosis and Hyalinosis (Paramyloidosis) in Reticulo-Endothelial System in Boeck's Sarcoid and Other Conditions. Morphologic Immunity Reaction. G. Teilum. -p. 389.
Hyperglobulinemia, Periarterial Fibrosis of Spleen, and Wire Loop Lesion in Disseminated Lupus Erythematosus in Relation to Allergic Pathogenesis. G. Teilum. -p. 409.
Effects of Alloxan upon Function and Structure of Normal and Neoplastic Pancreatic Islet Cells in Man. J. W. Conn and D. L. Hinerman. -p. 429.

Tumors of Carotid Body.—LeCompte points out that tumors of the carotid body or glomus caroticum have been called by many names, including perithelioma, endothelioma, angioma, chromaffinoma, adenoma, paraganglioma, pheochromocytoma and sympathoblastoma. The variety of names reflects the current confusion regarding the development, structure and function of the carotid body. The carotid body is a chemoreceptor, not a gland of internal secretion, and is not part of the "chromaffin system." In a series of 17 tumors of the carotid body no true chromaffin reaction was demonstrated, and no evidence for the secretion of epinephrine was obtained in assay of the fresh tissue in 2 instances. Tumors of the carotid body exhibit a basic pattern of nests of principal cells surrounded by a more or less vascular stroma. Depending on the relative amounts of principal cells and stroma, they may be described as usual, adenoma-like or angioma-like. Use of the noncommittal term carotid body tumor is preferred to other names generally used. The great majority of these tumors are both histologically and clinically benign. In view of the high operative mortality it is doubtful whether they should be removed in those cases in which ligation of the carotid arteries is necessary.

American Practitioner, Philadelphia

2: 429-496 (March) 1948

Clinical Examination in Recognition of Heart Disease. B. Manchester. -p. 429.

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American Practitioner, Philadelphia

2: 429-496 (March) 1948

Clinical Examination in Recognition of Heart Disease. B. Manchester. -p. 429.

Ulcers of Leg in Mediterranean Disease.—Estes and his co-workers of the Mayo Clinic report observations on 3 sisters of Italian descent, aged 30, 23, and 19, respectively. All 3 at one time or another had had ulcerations of the skin of the legs. Local treatment for the ulcers and the administration of iron, liver extract and whole blood had not brought about any improvement in the ulcers or the general health of the 3 patients. In smears of specimens of blood from all 3 patients similar changes characteristic of Mediterranean disease, better known as Cooley's anemia, (familial erythroblastic anemia) were seen. These changes consisted of a great variation in the size and shape of erythrocytes, with many microcytes but no spherocytes. Hypochromasia and polychromatophilia were well defined, and normoblasts were present. Target cells were seen in all smears, but they were not conspicuous. The diagnosis of Mediterranean disease was made on the basis of familial anemia, increased resistance of the erythrocytes to hemolysis in hypotonic solution of sodium chloride, exceedingly active normoblastic erythropoiesis, and the failure of the anemia to respond to therapy. No other cause for the anemia could be found. Sickle cell anemia was eliminated by the absence of sickling, and congenital hemolytic icterus, had it been present, should have produced sperocytosis and increased fragility of the erythrocytes. Cutaneous ulceration of the legs of patients with Cooley's or Mediterranean anemia has not been described before. The observed cases prove the existence of this symptom. Such ulceration cannot be distinguished grossly from that occurring in sickle cell anemia and congenital hemolytic icterus. The outstanding histologic feature noted at biopsy of one of these ulcers is the prominent deposition of iron in the cutis. The authors conclude that the chronic ulcer on the leg of an anemic patient is not pathognomonic of a specific type of anemia. The exact character of the anemia must be determined by appropriate clinical and hematologic study.

California Medicine, San Francisco

68: 121-254 (March) 1948

Cardiac Calcifications, Annular and Valvular (Leaflet). C.E. Grayson. -p. 121.
Roentgen Cardiac Kymography: Electrocardiographic Correlation. S.F. Thomas and L.H. Garland. -p. 126.
*Major Trigeminal Neuralgia: Analysis of 245 Cases. E.W. Davis and H.C. Naffziger. -p. 130.
Relationship of Health Officer and Practicing Physician to Planning of Smaller Hospital and Health Center Facilities in California. P.K. Gilman. -p. 135.
Tularean Looks at Tularemia. R.W. Bosson. -p. 137.
*Treatment of Epilepsy with Methylphenylethyl Hydantoin (Mesantoin). R.B. Aird. -p. 141.
Acute Puerperal Mastitis: Review. W.G. Leary Jr. -p. 147.
Emotional Factors in Obstetric Practice. P.A. Reynolds. -p. 151.
Choreiform Syndrome: Its Significance in Children's Behavior Problems. A.R. Timme. -p. 154.
Clinical Significance of Chronic Parametritis. C.F. Fluhmann. -p. 159.

Major Trigeminal Neuralgia.—Davis and Naffziger say that major trigeminal neuralgia has been recognized as a clinical entity since Fothergill's classic description in 1776. They review 245 cases that have been observed at their hospital. The highest incidence was observed in patients aged between 50 and 60 years. The average duration of symptoms was around seven years. There was a sudden onset of jabbing, cutting, burning, lightning-like or electric-shocklike pain which radiated over one or more divisions of the trigeminal nerve. The radiation was to the peripheral distribution. The pain stopped as suddenly as it began. There were several patients who noted a peculiar prickling, burning, throbbing sensation for days or weeks prior to the first sharp pain. Treatment was primarily surgical. Alcohol was injected in 175 cases. Many patients had multiple injections. The longest period of relief following an injection of alcohol was seven years. The average duration of relief was from six to fourteen months. Neurectomies were performed in 50 patients. These were mainly supraorbital, infraorbital and inferior alveolar neurectomies. The period of relief averaged the same as with alcohol injection. Sensory root sections were done in 179 patients. In most of these either alcohol injection or neurectomy had been performed previously. If the pain is completely relieved by alcohol injection, the diagnosis is established and sensory root section can be carried out with confidence that the pain will be permanently relieved. The anesthesia produced by the injection also serves to accustom the patient to the permanent anesthesia produced by root section. Some patients who were poor operative risks have been kept in comfort by repeated alcohol injections over a period of years. It is believed that the procedure of choice is a differential section of the sensory root with sparing of the motor root.

Treatment of Epilepsy.—Aird reports observations on 75 patients in whom methylphenylethyl hydantoin ("mesantoin") was used. The sodium salt of diphenylhydantoin had proved ineffective or toxic. Other anticonvulsive agents used with "mesantoin" were given in the same optimal doses and combinations that had been worked out prior to the addition of the new agent. Toxic symptoms appeared in 7 patients and the hydantoin derivative produced no appreciable benefit in an additional 8 patients. Eighty per cent of grand mal seizures were improved, 78 per cent of jacksonian seizures were helped and 79 per cent of psychomotor seizures were benefited. Sixteen patients with petit mal appeared to derive some benefit, but the improvement was great in only 7 of these. The limited results on petit mal forbid any final evaluation of the hydantoin derivative against this type of seizure. These results are comparable with those obtained in other studies on this new anticonvulsive agent. The great value of the drug in convulsive states other than petit mal and its relatively low toxicity suggest that it will prove a valuable substitute for "dilantin." Although of low toxicity if used cautiously, "mesantoin" may be associated with alarming toxic symptoms. One fatal case of aplastic anemia occurred in this group.

Connecticut State Medical Journal, Hartford

12: 193-288 (March) 1948

Problems in Thoracic Surgery as Seen in General Hospital. R.S. Lampson. -p. 195.
Procedures for Reducing Maternal Mortality. J.H. Howard. -p. 201.
Observations on Management of Cancer in Connecticut. E.J. Ottenheimer. -p. 211.
Teratoma of Ovary, Removal with Subsequent Pregnancy. L.S. Ward and R.T. Henkle. -p. 215.
Dermoid Cyst of Bridge of Nose. A.J. Ryan. -p. 218.
Local Public Health Practice in Connecticut Today. J.A. Dolce. -p. 222.
New Horizons for Old Age. T.G. Klumpp. -p. 224.

Endocrinology, Springfield, Ill.

42: 77-152 (Feb.) 1948

Metabolism of Steroid Hormones. R.I. Dorfman, Ethelreda Ross and R.A. Shipley. -p. 77.
Studies on Bioassay of Hormones. R.I. Dorfman and Adeline S. Dorfman. -p. 85.

Accumulation of Radioactive Iodide by Thyroid Gland in Normal and Thyrotoxic Subjects and Effect of Thiocyanate on Its Discharge. M.M. Stanley and E.B. Astwood. -p. 107.
Spiral Arteries in Human Ovary. B. Delson, S. Lubin and S.R.M. Reynolds. -p. 124.
Role of Steroid Hormones in Relaxation of Symphysis Pubis of Guinea Pig. M. X. Zarrow. -p. 129.
Influence of Mixtures of Androsterone and Dehydroisoandrosterone on Biologic Response. H. C. Grauer, W. F. Starkey and Eleanor Saier. -p. 141.

Geriatrics, Minneapolis

3:1-66 (Jan.-Feb.) 1948. Partial Index

Accident Hazards of Old Age: Physician's Role in Program of Prevention. F. D. Zeman. -p. 15.
*Thrombosis-Embolism Problem Associated with Hip Fractures in Aged. H. F. Bishop. -p. 25.
Further Studies on Electrocardiographic Changes in Old Age. T. T. Fox, J. C. Weaver and H. L. Francis. -p. 35.

3:67-134 (March-April) 1948. Partial Index

Gynecologic Surgery in Elderly Woman. A.F. Lash. -p. 67.
Progress in Solution of Cancer Problem. W. S. Bainbridge. -p. 72.
Treatment of Trauma in Aged. I. E. Siris and J. H. Mulholland. -p. 79.
Geriatrics and General Practitioner. H. Seidel. -p. 99.
Personality Adjustment Following Hospital Treatment in Patients with Involutional Psychosis, Melancholia. H. E. Clow. p. 94.

Thrombosis-Embolism Problem in Hip Fractures.—Bishop presents the case of a woman, aged 76, who died during manipulation of a hip that had been fractured for eighteen days. Thrombosis had not been suspected. Since this is a common type of fracture in the aged, and since many such patients are not manipulated or operated on for several days or weeks following time of injury, it was thought that perhaps other similar types of death might be explained on the basis of thrombosis and embolism. A search for similar cases has been maintained by careful scrutiny of the literature and close questioning of orthopedic, geriatric and anesthetist physicians. A total of 17 cases has been collected in which death occurred from pulmonary embolism during or shortly following operative procedures on fractured femurs. Necropsies substantiated this diagnosis in 14 cases of this series. The embolus was fat in 3 instances. Death was sudden and occurred during operation (without forewarning) in 11 of the 17. The ages of the patients in this series ranged from 35 to 86 years. The author points out that a relation exists between the elderly patient confined to bed with a hip fracture and thromboembolic disease and that the longer operative treatment is delayed following injury, the greater will be the possibility for thrombosis to develop in the fractured extremity. If the fracture is old, preventive measures should be instituted prior to surgical procedures. These might include the use of anticoagulants, venous ligation or mobilization of the patient. A plea is made for early ambulation in all elderly patients suffering from fracture of the hip. Rest in bed should be considered unphysiologic in the management of hip fractures in the aged.

Journal of Aviation Medicine, St. Paul

19: 1-60 (Feb.) 1948

Development of Aircraft Oxygen Equipment by USAF. F. W. Berner and D. R. Good. -p. 2.
Nominating Technic as Method of Evaluating Air Group Morale. J. G. Jenkins. -p. 12.
Psychologic Research at AAF School of Aviation Medicine. M. Roff. -p. 20.
*Of What Importance are Psychological Factors in Motion Sickness? G. R. Wendt. -p. 24.
Training for Voice Communication at High Altitudes. J. W. Black. -p. 34.
Human Tolerance to Negative Acceleration of Short Duration. R. S. Shaw. -p. 39.
Application of Human Engineering to Flight Problems. L. C. Mead. -p. 45.
Aero Medical Program in Army Air Forces. M. C. Grow. -p. 52.
Distance Discrimination. VI. Relationship of Visual Acuity to Distance Discrimination. M. J. Hirsch and F. W. Weymouth. -p. 56.

Psychologic Factors in Motion Sickness.—Wendt states that the character of the motion, the posture of the head and the physiologic state are major determiners of motion sickness rates. The Army and Navy personnel who were the subjects of these experiments did not get sick, even though psychologic factors were present, unless the combination of physical and physiologic factors was appropriate. Although psychologic factors are operative, physical and physiologic factors outweigh them in practical importance. The view that airsickness is "all psychologic" is a defeatist position. In practice, psychologic preventive measures are sometimes a failure. Such procedures should be used, but fewer miracles are to be expected of them than from manipulation of the physics and physiology of the situation. After citing several psychologic factors that would help in overcoming motion sickness, the author stresses the importance of a better understanding of the kinds of motion that produce sickness, followed by changes in design and operating procedures, a better understanding of the role of posture, followed by routine adoption of favorable postures when the motion becomes unfavorable, and better understanding of the physiology of motion sickness so that prophylactic drugs may be studied.

Journal of Bacteriology, Baltimore

55: 287-450 (March) 1948. Partial Index

International Bacteriologic Code of Nomenclature. R. E. Buchanan, R. St. John-Brooks and R. S. Breed. -p. 287.
Demonstration of Phosphatases and Lipase in Bacteria and True Fungi by Staining Methods and Effect of Penicillin on Phosphatase Activity. M. Bayliss, D. Glick and R. A. Siem. -p. 307.
Production of Streptomycin by Streptomyces Bikiniensis. D. B. Johnstone and S. A. Waksman. -p. 317.
Physiologic Studies on Spore Germination, with Special Reference to Clostridium Botulinum. III. Carbon Dioxide and Germination, with Note on Carbon Dioxide and Aerobic Spores. E. S. Wynne and J. W. Foster. -p. 331.
*Relative Antisyphilitic Activity of Penicillins F, G, K, and X and of Bacitracin, Based on Amounts Required to Abort Early Syphilitic Infections in Rabbits. H. Eagle and R. Fleischman. -p. 341.
Action of Bacitracin and Subtilin on Treponema Pallidum in Vitro and in Vivo. H. Eagle, Arlyne D. Musselman and R. Fleischman. -p. 347.
Antigenic Structure of Bacterial Spore. Beatrice W. Dosk and C. Lamanna. -p. 373.
Studies on Effect of Immune Reactions on Metabolism of Bacteria: 1. Methods and Results with Eberthella Typhosa. M. G. Sevag and Ruth E. Miller. -p. 381.
Serologic and Biologic Characteristics and Penicillin Resistance of Nonhemolytic Streptococci Isolated from Subacute Bacterial Endocarditis. S. S. Schneierson. -p. 393.
Some Properties of Antibiotic Obtained from Species of Streptomyces. D. Gottlieb, P. K. Bhattacharyya, H. W. Anderson and H. E. Carter. -p. 409.
Factors Affecting Production of Tetanus Toxin: Temperature. J. H. Mueller and Pauline A. Miller. -p. 421.

Antisyphilitic Activity of Penicillins F, G, K and X and of Bacitracin.—Eagle and Fleischman inoculated rabbits intradermally with Treponema pallidum, and treated them four days later with intramuscular injections of the various penicillins or bacitracin, repeated once daily for four days. The doses of penicillins F, G, K and X and of bacitracin that aborted infection in half the animals were, respectively, 3.5, 0.3, 2.6 and 2.2 mg. per kilogram of body weight and 90 units per kilo-

gram. The absolute and relative activities of the various penicillins and bacitracin varied widely according to the method of assay. Penicillin G was by far the most effectively antisyphilitic of the compounds tested.

Journal of Bone and Joint Surgery, Boston

30B: 1-228 (Feb.) 1948

Recurring Dislocation of Shoulder. W.E. Gallie and A. B. Le Mesurier. -p. 9.
Habitual Dislocation of Shoulder: Putti-Platt Operation. H. Osmond-Clarke. -p. 19.
Recurrent Dislocation of Shoulder. J. C. Adams. -p. 25.
Recurrent Dislocation of Shoulder: Lesions Discovered in 17 Cases, Surgery Employed, and Intermediate Report on Results. A. L. Eyre-Brook. -p. 39.
Note on Recurrent Dislocation of Shoulder Joint: Superior Approach Causing Only Failure in 52 Operations for Repair of Labrum and Capsule. R. Watson-Jones. -p. 49.
Bone Block Method for Recurrent Dislocation of Shoulder Joint. I. Palmer and A. Widén. -p. 53.
*Evolution of Mold Arthroplasty of Hip Joint. M. N. Smith-Petersen. -p. 59.
*Postoperative Study of "Vitallium" Mold Arthroplasty of Hip Joint. W. A. Law. -p. 75.
Plantar Digital Neuritis. Morton's Metatarsalgia. K. I. Nissen. -p. 84.
Arthrodesis in Tuberculosis of Hip Joint. Analysis of 50 Cases. J. Dobson. -p. 95.
Behavior of Penicillin in Synovial Cavities. G. B. Jones. -p. 105.
*Hematogenous Osteitis in Children: Preliminary Report on Treatment with Penicillin. W.M. Dennison. -p. 110.

Mold Arthroplasty of Hip Joint.—Smith-Petersen says that a benign reaction to an inert foreign body (glass) gave rise to the thought that here was a process of repair which might be applied to arthroplasty. A mold of some inert material, interposed between the newly shaped surfaces of the head of the femur and the acetabulum, would guide nature's repair so that defects would be eliminated. The original glass molds were abandoned because of easy breakage, and the use of other materials was discontinued because of foreign body reaction. In 1938 the first "vitallium" mold arthroplasty was performed, and since then over 500 hips have been operated on by this method at the Massachusetts General Hospital. The fact that this operation has been performed on such an extensive scale is evidence that the results have been satisfactory. Malum coxae senilis, rheumatoid arthritis, complications of fractured hips, old septic hips, congenital dislocations and practically all conditions to which the hip joint is subject were treated by this operative procedure. Fifty-three patients have been subjected to revisions of the first arthroplasty. Calcification of the rectus tendon made some of the revisions necessary. Furthermore, the need for a relatively large acetabulum was not fully appreciated at first. Many patients with rheumatoid arthritis have undergone operation a second time because of a decreasing range of movement. Sepsis has been responsible for a small number of revisions. There has been no operative mortality in these 500 arthroplasties.

Postoperative Study of Mold Arthroplasty.—Law carried out a detailed study of "vitallium" mold arthroplasty of the hip joint. In this series of 150 cases of arthritis of the hip joint treated by "vitallium" mold arthroplasty (182 arthroplasties), 80 per cent of late results are satisfactory. Striking features are the relative painlessness, smooth movement of the hip joint, formation of the joint lines as seen radiographically in the postoperative period. Function of the hip joint after arthroplasty for traumatic and degenerative arthritis approaches the normal much more closely than in cases of infective and rheumatoid arthritis. There is a complete absence of low back symptoms or postural difficulties, and there is no difficulty in preventing stiffness of the knee joint. Different technical procedures are indicated according to the degree of absorption of the femoral head or neck, and the stability of the mold in the acetabulum. The operative mortality rate in this series was nil, and during the six year follow-up period only 1 patient died as the result of a complication of the arthroplasty. Secondary operative revisions are often necessary, particularly in cases of infective and rheumatoid arthritis.

Penicillin in Hematogenous Osteitis in Children.—Dennison says that during the first eighteen months in which penicillin was available in the Glasgow Royal Hospital for Sick Children, 56 patients with osteitis were treated in one surgical unit. Of these, 30 patients had severe toxemia; in 9 the bone lesion was the outstanding feature and toxemia was slight; the remaining 17 were admitted for the treatment of chronic pyogenic bone infection. The term osteitis is used as meaning acute or chronic infection of bone tissue; it includes the conditions known as osteomyelitis and periostitis. The affected part was immobilized until radiographic examination showed sound consolidation, that is, for periods of from two to eight months. During the first twelve months, penicillin was given by continuous intramuscular drip for ten to fourteen days. Subsequently, owing to difficulties with drip infusions, the author reverted to intermittent intramuscular injection. Administration of penicillin was continued for twenty-one days, or until the marrow culture was reported sterile, and the total dose varied from 1.1 to 8.4 mega (million) units according to age. If pus was present in soft tissues when the patient was admitted, general penicillin administration was started and the limb was immobilized. Pus was evacuated within twelve hours by aspiration or incision. Each morning aspiration through the indwelling tube was attempted and the fluid was sent for culture and penicillin assay; 100,000 units were again instilled. If there was no evidence of pus formation in the soft tissues the limb was immobilized and general penicillin therapy was instituted. If, pain, tenderness and signs of toxemia were not relieved within forty-eight hours, operative treatment was undertaken in order to reduce the tension of pus under the periosteum. Increasing swelling, tenderness or erythema was obvious indication for surgical intervention. Bone drilling was performed in 6 instances--always with dramatic relief from pain. Sequestrum formation requiring surgical intervention occurred in 6 cases. All wounds remained healed after primary suture. There were no deaths, pathologic fractures or ankylosed joints in the patients with acute osteitis. The average hospital stay was thirty-two days.

Journal of Experimental Medicine, New York

87:175-258 (March) 1948. Partial Index

Effect of Enzyme Inhibitors and Activators on Multiplication of Typhus Rickettsiae: III. Correlation of Effects of PABA and KCN with Oxygen Consumption in Embroynate Eggs. D. Greiff and H. Pinkerton. -p. 175.
Studies on Proteolytic Enzyme in Human Plasma. O. D. Ratnoff. -p. 199.
Proteins in Unheated Culture Filtrates of Human Tubercle Bacilli. Ellen B. Bevilacqua and Janet R. McCarter.-p. 229.

Journal of Investigative Dermatology, Baltimore

10:91-224 (March) 1948

Foolproof Radium Technic for Treatment of Hemangiomas. G. C. Andrews. -p. 95.
Allescheria Boydii, Causative Agent in Case of Meningitis. Rhoda W. Benham and Lucille K. Georg. -p. 99.
Local Treatment of Tinea Capitis Due to M. Audouini: Importance of Inflammatory Reaction as Index of Curability. J. P. Scully, C. S. Livingood and D. M. Pillsbury. -p. 111.
Studies on Effect of Thallium Poisoning of Rat. Influence of Cystine and Methionine on Alopecia and Survival Periods. P. Gross, Edith Bunne and J. W. Wilson. -p. 119.
Mycosis Fungoides: Report of 2 Unusual Cases with Autopsy Findings. C. F. Post and C. S. Lincoln. -p. 135.
Mycetoma-Like Chromoblastomycosis Affecting the Hand: Further Findings and Comparative Mycologic Studies. G. M. Lewis, Mary E. Hopper, W. Sachs and others. -p. 155.
Penicillin Treatment of Neurosyphilis: Study of 45 Cases That Had Previously Received Chemotherapy. L. P. Barker. -p. 159.
*Local Use of Bacitracin. J. L. Miller, M. H. Slatkin and Balbina A. Johnson. -p. 179.
Hamartoma of Skin: Case Report. S. C. Way. -p. 189.
Cutaneous Complications of Mass Vaccination in New York City, 1947. Helen Ollendorff Curth, W. Curth and J. Garb. -p. 197.
Polymorphic Prurigo. Psychosomatic Study of 3 Cases. E. Schneider and Beatrice Kesten. -p. 205.
Nodular Nonsuppurative Panniculitis Complicating Diabetes Mellitus. G. F. Machacek. -p. 215.

Local Use of Bacitracin.—Miller and his coworkers report the clinical results and the bacteriologic data in a study of 165 patients treated with bacitracin in an ointment base. They found that bacitracin ointment, 480 units per gram, is an effective agent against superficial pyogenic infections. In impetigo the median time of cure with bacitracin ointment of eight days compares favorably with six days when penicillin or sulfonamide ointments were used. The bacitracin ointment caused a contact type of dermatitis in less than 1 per cent of cases. Patch tests after treatment, even at sites of former dermatitis, were all negative. The effectiveness and low sensitizing potential of bacitracin suggest its trial against infectious eczematoid dermatitis, folliculitis, vesiculopustular eruptions of the hands, and in the secondary infections accompanying many dermatoses. In general, organisms known to be sensitive to penicillin were found to be sensitive to bacitracin.

Journal-Lancet, Minneapolis

68:43-78 (Feb.) 1948

Cardiac Emergencies and Their Treatment. M. Barron. -p. 43.
Report of Influenza Type A Epidemic. G. X. Trimble. -p. 50.
*Histamine Antagonists in Treatment of Allergy. L. H. Criep. -p. 55.
*Metrazol Therapy in Barbiturate Poisoning: Case Report. O. J. Engstrand and W. W. Hruza. -p. 59.
Allergic Carditis, Pericarditis and Pleurisy: Report of Case of Serum Sickness with Predominant Cardiac Manifestations and Symptomatic Recovery. Preliminary Report. C. A. McKinlay. -p. 61.

Histamine Antagonists in Allergy.—Based on the concept that allergic symptoms are due to histamine action, attempts have been made to treat the allergic patient with various histamine antagonists. Criep says that "hapamine," histaminase, "anthallan" (a benzofuran derivative) and histamine itself are of little value. "Benadryl," "pyribenzamine," Nu 1504 ("thephorin") and "thenylene" have proved useful only in the symptomatic treatment of certain allergic disorders. These are acute and chronic urticaria, the urticarial lesions of serum sickness, insulin and drug allergy, the pruritus of atopic dermatitis, seasonal hay fever and allergic rhinitis. The side actions evoked by these drugs limit their scope of usefulness. Some of their effect may be due to their sedative action. They do not prevent or alleviate the development of asthma in pollen-sensitive patients.

"Metrazol" for Barbiturate Poisoning.—Engstrand and Hruza report the case of a woman, aged 41, who had taken 30 to 35 tablets of phenobarbital, or about 52 grains (3.36 Gm.), with suicidal intention. She was hospitalized in deep coma about forty-five minutes after she had taken the tablets. The stomach was immediately lavaged with 2 quarts (2,000 cc.) of isotonic solution of sodium chloride, and magnesium sulfate was instilled. She was given apomorphine without effect. Picrotoxin was administered at the rate of 1 mg. per minute with a total dose of 45 mg. Improvement in the rate and depth of the respirations and in the color of the patient resulted, but the reflexes remained absent. An ampule of 25 per cent solution of nikethamide was also given without apparent effect. The patient remained comatose. Evidence of pulmonary edema with frothing at the mouth was noted. Oxygen by nasal catheter and various supportive measures were continued for many hours, but she remained comatose and cyanotic. "Metrazol" (pentamethylenetetrazol) 5 cc. was injected intravenously and repeated fifteen minutes later. This resulted in some improvement in respiration. Subsequently more of the drug was given, a total of 80 cc. in divided doses being administered over a period of eighteen hours. The patient recovered and six months later was gainfully employed.

Journal of Nat. Cancer Inst., Washington, D.C.

8:91-160 (Dec.) 1947. Partial Index

Evaluation of Carcinogenicity of a Series of Esters of Carbamic Acid. C. D. Larsen. -p. 99.
Use of Perforated Cellophane for Growth of Cells in Tissue Culture. Virginia J. Evans and W. R. Earle. -p. 103.
Inhibition of Estrogen-Induced Tissue Growth with Progesterone. H. Hertz, C. D. Larsen and W. Tullner. -p. 123.
Thiamine Deficiency and Thiamine Requirements in C3H Mice. H. P. Morris and Celia S. Dubnik. -p. 127.

Journal of Pediatrics, St. Louis

32:113-226 (Feb.) 1948

New Technic for Replacement Transfusion in Treatment of Hemolytic Disease of Newborn Infant. D. P. Arnold and K. M. Alford. -p. 113.
Prophylaxis of Upper Respiratory Infections in Children Treated with Oral Penicillin. J. H. Lapin. -p. 119.
Substitute for Skeletal Age (Todd) for Clinical Use: Red Graph Method. S. I. Pyle, A. W. Mann, S. Dreizen and others. -p. 125.
Red Graph and Wetzel Grid as Methods of Determining Symmetry of Status and Progress During Growth. A. W. Mann, S. Dreizen, S. I. Pyle and T. D. Spies. -p. 137.
Do Erythroblastotic Newborn Infants Destroy Rh-Negative Red Blood Cells? E. L. Kendig Jr. -p. 151.
Natural Incidence of Influenza Antibodies in Children of Different Age Groups. P. Cohen and H. Schneck. -p. 154.
Effect of Influenza Virus Vaccination in Infants and Children, with Antibody Studies. P. Cohen and H. Schneck. -p. 161.
*Body Size and Growth Rate of Children with Diabetes Mellitus. Carolyn K. Beal. -p. 170.
Further Studies of Nitrogen and Fat Metabolism in Infants and Children with Fibrosis of Pancreas. A. T. Shohl. -p. 180.
Torsion of Appendix Testis. W. M. Coppridge and L. C. Roberts. -p. 184.
*Megaloblastic Anemia in Infancy. B. J. Siebenthal. -p. 188.
Silver Nitrate Stencil Staining for Identification of Newborn Infants. H. Cohen. -p. 193.

Growth of Children with Diabetes Mellitus.—Beal analyzed the growth records of 200 children under treatment for diabetes mellitus and compared them with the body size and growth rates of normal children. The data for both groups were collected in Iowa between 1928 and 1945. Children who acquire diabetes mellitus are of normal height for age at the time of onset of the disease. The heights of children who were first examined between six months and three years after the onset of diabetes mellitus differed from normal height for age by an average of minus 1.1 inches (2.8 cm.); of children first examined more than three years after onset, by an average of minus 3.9 inches (9.9 cm.). These observations demonstrate a relationship between height and the duration of untreated or inadequately treated diabetes. The mean annual gain in weight for diabetic children between the ages of 5 and 7 years was slightly less than the gain for normal children. The mean annual gain for the diabetic children between 7 and 9 years of age was substantially less than for normal children. The diabetic boys were, on the average, 1.9 inches (4.8 cm.) shorter than normal boys at 17 years of age. However, later than normal growth in height enabled them to achieve an average gain of 1.7 inches (4.3 cm.) after 17 years of age. As a result of this gain, their mean adult height was essentially the same as normal adult height. The diabetic girls deviated from normal by an average of ½ inch (1.27 cm.) at 16 years of age and gained an average of 0.6 inch (1.5 cm.) after age 16. Thus, although both sexes were, on the average, shorter than the normal height at the time that growth is usually terminated for the normal child, additional gains led to the attainment of normal adult stature.

Megaloblastic Anemia in Infancy.—According to Siebenthal true pernicious anemia is seldom observed in infants. It differs from other macrocytic anemias, including megaloblastic anemia. This megaloblastic anemia is a temporary deficiency of the antianemic principle. The condition is seen most often in infants between 2 and 16 months of age. The child with megaloblastic anemia exhibits pallor, weakness, irritability, persistent upper respiratory infection and extreme loss of appetite. These infants have a severe normochromic anemia with many macrocytes. The bone marrow shows erythropoiesis to be megaloblastic. The author reports 2 infants with megaloblastic anemia. Both responded favorably to treatment with folic acid. The infant 6 months of age was given 5 mg. of the drug and the infant aged 16 months, 10 mg. orally twice a day. A prompt reticulocyte response was demonstrated, followed by a gradual rise in hemoglobin and red blood cell level. The folic acid therapy was continued for four months in the first infant and only during the thirty days of hospitalization in the second. The further development was satisfactory in both cases. Megaloblastic anemia is a relatively common disease of white infants. A complete and permanent recovery can be effected by folic acid therapy.

Journal of Pharmacology & Exper. Therap., Baltimore

92: 207-362 (March) 1948. Partial Index

Streptomycin in Blood: Chemical Determinations After Single and Repeated Intramuscular Injections. G. E. Boxer, Viola C. Jelinek, R. Tompsett and others. -p. 226.
Pharmacologic Studies of d-Tubocurarine and Other Curare Fractions. G. M. Everett. -p. 236.
Pharmacologic Properties of New Antihistaminic, 2-Methyl-9-Phenyl-2,3,4,9-Tetrahydro-1-Pyridindene (Thephorin) and Derivatives. G. Lehmann. -p. 249.
Effect of Ether and Dial-Urethane Anesthesia on Passage of Sulfathiazole into Cerebrospinal Fluid. R. S. Teague and M. Perdue. -p. 277.
Anticonvulsant Action of Isopropyl Alcohol. Nai Chu, R. L. Driver and P. J. Hanzlik. -p. 291.
Goitrogenic Compounds: Pharmacologic and Pathologic Effects. J. Seifter and W. E. Ehrich. -p. 303.
Studies with Tetrazole Derivatives. E. G. Gross and R. M. Featherstone. -p. 323.
Influence of Autonomic Nervous System on Intestinal Absorption of Hypertonic Solution of Glucose. F. Huidobro, R. Valdés and M. Dávila. -p. 336.
Effect of Acidosis and Anoxia on Concentration of Quinacrine and Chloroquine in Blood. J. W. Jailer, C. G. Zubrod, M. Rosenfeld and J. A. Shannon. -p. 345.

Military Surgeon, Washington, D.C.

102: 169-250 (March) 1948. Partial Index

Recent Advances in Medical Management of Cirrhosis of Liver. M. Friedman. -p. 169.
Thymol Turbidity Test for Liver Dysfunction. R. C. Dunn. -p. 173.
*Glass Button Operation for Palliative Relief of Ascites. J. D. Lane. -p. 177.
Bacteriologic Comparison of Penicillin and Silver Nitrate for Prophylaxis Against Ophthalmia Neonatorum. H. C. Franklin. -p. 179.
External Skeletal Fixation Used with Ordinary Extension Splints in Treatment of Fractures of Both Bones of Leg. R. L. Waugh. -p. 188.
Haynes Splint Treatment of Fractures of Long Bones. J. B. Spriggs. -p. 191.
Acute Arterial Injuries of Lower Extremity. G. E. Gillespie. -p. 193.
Clinical Use of Streptomycin. L. L. Terry. -p. 198.
*Some Otic Complications of Streptomycin Therapy. F. B. Snell. -p. 202.
Cutler-Guyton Eye Implant and Prosthesis: Two Cases. R. S. Lloyd and R. M. Jones. -p. 205.
Advantages and Disadvantages of Unit Record System for Marine Hospitals. J. L. Wilson. -p. 208.
Pain Pathways in Herniated Nucleus Pulposus Syndrome: Preliminary Report. R. H. English and J. B. Spriggs. -p. 213.
Present Trends in Research in Physical Medicine. S. Mead. -p. 217.
Information for Rheumatic Fever Patient in Military Hospital. S. R. Kelson. -p. 219.

Glass Button Operation in Ascites.—Lane believes that many patients with ascites are in no condition to undergo major surgical procedures. For this reason, the glass button operation has been tried with a certain amount of success. It consists of implanting one or more buttons or spools made of glass in the abdominal wall, so that the ascitic fluid may drain directly into the subcutaneous tissues. The author has used this procedure in 7 cases. Two of these were failures. Three have had fair to moderate results. Three have had excellent results with complete disappearance of edema and ascites; these latter 3 went into positive nitrogen balance as they gained weight without accumulations of fluid. The author admits that the procedure has its faults and does not always work, but it is a minor procedure that can be carried out in patients who are poor surgical risks. It does relieve increased intra-abdominal and intrathoracic pressure. It does allow partial restoration of protein balance.

Otic Complications of Streptomycin Therapy.—According to Snell, complications of streptomycin therapy include vertigo, tinnitus, impaired hearing, blurring of vision, eosinophilia, circumoral pruritus, dermatitis, angioneurotic edema, albuminuria and granular casts in the urine. Vertigo seems to be the most lasting of these complications. Closely associated with this vertigo or dizziness is blurring of vision. The St. Louis Streptomycin Conference held in May 1947, and sponsored by the National Research Council, presented 809 cases which had been treated according to the old regimen, which consists of dosage scale of 2 Gm. of the

agent daily for one hundred and twenty days. Of these, 96 per cent showed subjective and objective symptoms of vestibular damage. The damage ranged all the way from those patients who showed only objective symptoms (caloric test) to those who were so affected that the drug was discontinued. As yet no data are available as to the permanence of this damage, but fortunately, the patient seems to recover from deafness in the majority of cases.

New Jersey Medical Society Journal, Trenton
45: 51-100 (Feb.) 1948

Volvulus of Sigmoid Colon: Report of 4 Cases. W. A. Loeb and C. M. Robbins. -p. 54.
Treatment of Coronary Thrombosis. H. C. Crossfield. -p. 58.
Conservative Use of Gastroscope. T. S. Heineken. -p. 61.
Recent Advances in Gynecology. M. H. Weiss. -p. 64.
Histamine Headache. J. L. Witkowski. -p. 69.
Ophthalmology in Pediatric Practice. L. W. Hughes. -p. 71.

45: 101-146 (March) 1948

*Osteoid-Osteoma. R. H. Goldenberg. -p. 104.
Depression Masking Organic Diseases and Organic Diseases Masking Depression. S. A. Sandler. -p. 108.
*Thrombophlebitis Migrans in Carcinoma of Stomach. L. F. Baum, O. S. Baum and J. H. Hermann. -p. 111.
Infantile Paralysis in Newark—1947. C. V. Craster. -p. 113.
Leukemia-Like Reaction to One Dose of Sulfadiazine. L. G. Scott. -p. 115.
Sources and Potencies of Hormones, W. H. Stoner. -p. 116.

Osteoid Osteoma.—Goldenberg says that in the twelve years which have elapsed since Jaffe first described the clinical and pathologic characteristics of a benign tumor which he designated as osteoid-osteoma, 141 cases have been reported. An osteoid-osteoma is usually about a centimeter in diameter. The tumor has been found in almost all bones but is more commonly observed in the lower extremities. The pain, usually mild and intermittent at the time of the onset, may be aggravated by activity. Later the pain becomes constant and increases in intensity. In early cases the roentgen examination discloses a small oval area of rarefaction surrounded by a zone of sclerosis. In 3 of Goldenberg's 4 cases a history of trauma was elicited. Three of the 4 patients were treated surgically, and the symptoms subsided in each of these. The fourth case is incomplete, in that operation was postponed on account of pregnancy. The symptoms in this case had persisted for ten years. Because of the small size of the lesion it is imperative that roentgenograms be available in the operating room for accurate localization and for postoperative assurance that the tumor has been completely excised. The removal of the sclerosed bone does not appear to be necessary as long as the nidus has been removed.

Thrombophlebitis Migrans in Carcinoma of Stomach.—The Baums and Hermann discuss the syndrome of migrating thrombophlebitis in association with carcinoma. Carcinoma of the body or tail of the pancreas is most frequently implicated in this syndrome, but carcinoma of the stomach is sometimes the etiologic factor. A case of carcinoma of the stomach with symptoms of migrating thrombophlebitis and few gastrointestinal complaints is reported. Because of anemia and migrating thrombophlebitis, a presumptive diagnosis of carcinoma of the body or tail of the pancreas was made, and an exploratory laparotomy was performed. A carcinoma of the stomach was found on the lesser curvature near the cardia with metastases to the regional lymph nodes and the left lobe of the liver. The patient had an uneventful postoperative course. At home his course was slowly downhill with gradual emaciation and episodes of thrombophlebitis involving the left femoral and left subclavian veins. Terminally a cord bladder was noted, due either to metastatic involvement or possibly to thrombosis of spinal cord veins.

Ohio State Medical Journal, Columbus
44: 225-328 (March) 1948

New Anticonvulsant Drugs in Treatment of Epilepsy. H. D. Fabing and J. R. Hawkins. -p. 257.
Medical Aspects of Juvenile Delinquency. W. F. Schneider. -p. 260.
Present-Day Concepts of Rheumatic Fever. A. T. Martin. -p. 265.
Soils and Health. P. B. Sears. -p. 269.
Surgical Conditions of Infancy. D. M. Glover. -p. 272.
Chemotherapy in Infants and Children: II. Penicillin. J. G. Kramer. -p. 277.
Squamous Cell Carcinoma Following Prolonged Use of Arsenic: Case Report. J. W. Robertson and K. W. Clement. -p. 280.

Rocky Mountain Medical Journal, Denver
45: 97-184 (Feb.) 1948

Care of Patient with Terminal Cancer. H. J. Morgan. -p. 116.
Analysis of 4,000 Operations for Gallbladder and Biliary Duct Disease. C. G. Heyd. -p. 119.
Treatment of Psychosomatic Conditions: Psychosomatic Concept. O. S. English. -p. 123.
Endocrine Problems in Adolescence. H. H. Gordon. -p. 127.
*Protein Nutrition and Conservation. Gladys Kinsman. -p. 133.
"Catch" in Sickness Insurance. F. B. Exner. -p. 135.

Protein Nutrition and Conservation.—Kinsman points out that proteins are unique among the three classes of food substances (carbohydrates, fats and proteins) because they alone contain the most important raw materials, the amino acids out of which the complex tissues of the body are constructed. Since only protein can furnish amino acids for the building of body tissues, it is obvious that the protein requirement is greatest when new tissues or secretions are being formed, i.e., during the growth period and during pregnancy and lactation. The normal adult, man or woman, requires for optimal health only slightly more protein than is sufficient to replace the body and plasma proteins that are being broken down in tissue metabolism. In infancy and childhood protein requirements are much higher in relation to body weight. When protein is used for energy it yields approximately the same number of calories per unit of weight as does carbohydrate. When protein-containing foods are scarce, it is obviously unsound practice to use protein for energy. It might be more economical to obtain sufficient calories from carbohydrates and fats to meet the energy requirements of the body. The protein, supplied in an amount sufficient to meet the specific protein requirement, is then available for the repair and building of body tissues. If enough calories from carbohydrate and fat sources are not provided in the diet, the ingested amino acids will be used for energy.

Southern Surgeon, Atlanta
14: 61-164 (Feb.) 1948

Venous Thrombosis of the Extremities. D.C. Elkin.—p. 61.
*Sympathectomy in Treatment of Thromboangiitis Obliterans. F.W. Cooper Jr. and M.H. Harris.—p. 70
Diverticula of the Colon. J.D. Martin Jr. and R.S. Caudle.—p. 82.

Carcinoma of the Breast. R.L. Brown, J.E. Scarborough and M.B. Davis.—p. 94.
Modern Methods of Diagnosis and Treatment of Mediastinal Masses. O.A. Abbott.—p. 101.
Spinal Cord Tumors and Similarity of Their Symptoms to Those of Other More Common Diseases. E.F. Fincher and H.S. Swanson.—p. 111.
Posterior Tibial Nerve Injuries. W.C. Ward.—p. 124.
Place of Colostomy in Present Day Surgery. D.H. Poer.—p. 130.
Transverse Abdominal Incisions. W.G. Whitaker Jr.—p. 143.
Surgical Treatment of Growth Deformities of Mandible. F.F. Kanthak and W.G. Hamm.—p. 147.
Fractures of Radial Head Associated with Chip Fracture of Capitellum in Adults; Surgical Considerations. P.L. Rieth.—p. 154.

Sympathectomy in Thromboangiitis Obliterans.—Cooper and Harris performed 186 sympathectomies on 113 men between the ages of 20 and 46 who had thromboangiitis obliterans. The duration of symptoms varied from one month to thirteen years. Both lower extremities were involved in 62 patients, one lower extremity in 45, one lower extremity and one upper extremity in 2, both lower and upper extremities in 4. Spinal anesthesia vasomotor tests to demonstrate the proportion and the pattern of organic and functional spastic elements of the disease in a given patient were performed before surgical intervention. All patients showed a rise in temperature of the feet during the test, the magnitude depending on the degree of vasospasm as well as the extent of development of collateral channels in the extremity. No instances of drop in skin surface temperature were encountered. Sympathectomies were performed on all patients who had ulcerations or gangrene. Bilateral lumbar sympathectomies were performed on all patients showing advanced arterial change in one lower extremity, even though only slight change was present in the opposite extremity. Division of the rami communicantes to the second and third dorsal ganglions and division of the chain below the third ganglion were performed for all operations on the upper extremities. All patients were admonished to abstain completely from the use of tobacco in any form. Additional therapy consisted of whiskey in small amounts four times daily and local care of the ulcers or gangrenous areas. After sympathectomy there was immediate relief of the unbearable aching and burning. The pain which persisted was described as a slight burning sensation which did not interfere with sleep and which was easily controlled by mild sedatives. Edema of the foot rapidly subsided. Healing of the wounds was rapid. In no instance was there a progression of gangrene following operation if the patient had stopped smoking. All patients appreciated the warmth of the extremities and the increased tolerance for cold. Major amputations were obviated in all patients except 3 in whom gangrene of a large portion of the foot had developed prior to sympathectomy. Sympathectomy is the treatment of choice in thromboangiitis obliterans.

Western J. Surg., Obst. & Gynecology, Portland, Ore.

56:65-126 (Feb.) 1948

Present Day Trends in Thyroid Research. J. H. Means. -p. 65.
Evaluation of Newer Methods of Treatment of Thyrotoxicosis. R. H. Williams. -p. 72.
Evaluation of Routine Exposure of Recurrent Nerves During Thyroid Operations. R. B. Cattell. -p. 77.
Functional Activity of Thyroid Tumors, Benign and Malignant, as Gauged by Their Collection of Radioactive Iodine. R. W. Rawson, Janet W. McArthur, B. M. Dobyns and others. -p. 82.
*Clinical Significance of Solitary Nodule in Thyroid Gland. M. H. Soley, S. Lindsay and M. E. Dailey. -p. 96.
Amputations. H. C. Blair and H. D. Morris. -p. 105.
Carcinoma of Colon. Comparative Study of Private and Charity Patients. T. M. Joyce. -p. 110.
Infertility Associated with Masculinizing and Feminizing Syndromes. S. J. Glass. -p. 116.
What Do We Know About Sterility? L. W. Mason. -p. 119.

Solitary Nodule in Thyroid.—According to Soley, Lindsay and Dailey, the single nodule in the thyroid is regarded by some as of the same significance as a nodule in the breast. It arouses suspicion because of the possibility of cancer. At the thyroid clinic of the University of California Hospital 96 patients with solitary thyroid nodules were seen between 1935 and 1944. Pathologic studies of the nodules showed 38 to be involutionary, 21 to be adenomas and 15 to be malignant neoplasms. In addition, 18 could not be classified as either involutional or neoplastic in origin. Rapidity of growth, coincidental appearance of goiter and symptoms, residence in an endemic goiter region, a family history of goiter, age, clinical history suggesting hemorrhage into a nodule, pressure symptoms and texture of the nodule were not as helpful as might be expected in the clinical differentiation of involutionary from neoplastic nodules. The singleness of the nodule is the most important factor. A solitary nodule in the thyroid should be radically resected.

Yale Journal of Biology and Medicine, New Haven

20:225-320 (Jan.) 1948

Trypanocidal Effect of Antibiotic Lactones and of Their Analogs. B. A. Rubin. -p. 233.
Arteriography in Cases of Aneurysm and Arteriovenous Fistula with Review of Literature Concerning Choice of Solution. H. B. Shumacker Jr. and Anne F. Godley. -p. 273.
*Method for Obtaining Bone Marrow by Vertebral Spinous Process Puncture. J. H. Huss, J. Gilbert and A. A. Liebow. -p. 291.
Immunochemistry of Mouse Tissue Components: I. Comparative Antigenic Composition of Normal Mouse Tissues. Esther S. Maculla. -p. 299.

Obtaining Bone Marrow from Vertebral Spinous Process.—Huss and his co-workers found that a method for obtaining marrow from the vertebral spinous process was in use in Japan. This technic had been extensively employed by the hematologist Nakao and his associates of Tokyo Imperial University. Its origin is apparently Japanese. The utility and simplicity of the method are impressive: (1) the patient faces away from the operator and is not disturbed by the sight of the needle; (2) the momentary pain when suction is exerted is less in the spinous process than in the sternum; (3) draping of the field is not necessary; the patient cannot breathe on the operative site; (4) the spinal column offers much more rigid support than does the sternum; (5) the cortical lamina of the spinous process is thinner and easier to penetrate than is the sternum; and (6) vital structures are removed by many centimeters from the point of entrance into the bone. With the sternal method penetration of the sternum has occasionally occurred with mediastinal hemorrhage, and there have been accidents from injury of the internal mammary artery. The authors made a statistical comparison of the differential counts of the sternal and of the vertebral bone marrows on 25 persons, 15 of whom were healthy and 10 were patients. They conclude that marrow comparable to that from the sternum may be obtained, although there is considerable variation in the differential counts, as there is in successive sternal punctures from the same patient. Vertebral puncture has additional value for the detection of tumor cells metastatic from the prostate or other organs.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Australian and New Zealand J. Surgery, Sydney 17: 163-232 (Jan.) 1948

Some Observations on Early Management of Gunshot Wounds of Arteries. D. Leslie. -p. 163.
*Reconstruction of Opposition Digits for Mutilated Hands. B.K. Rank and A.R. Wakefield. -p. 172.
Hirschsprung's Disease. J.A. Jenkins. -p. 189.
Indirect Inguinal Hernia: Contrast Between Sites of Recurrence After Simple and After Plastic Operation. C. Craig. -p. 207.

Reconstruction of Mutilated Hands.—Rank and Wakefield show that in the management of destructive hand injuries, consideration must be given to the possibilities of reconstruction or substitution for parts that are lost. Many of the ingenious and tedious operations that have been carried out on mutilated hands have a rare application; but some have become procedures, to be known and considered by all concerned with hand injury and repair. One such procedure concerns restoration of the "pinch" function to a mutilated hand by plastic reconstruction of an opposition digit or digits. The "pinch", or opposition, function in a normal hand involves essentially the function of a normal thumb. For this three considerations must be satisfied: (1) the thenar muscles must be present and in a functioning state; (2) there must be an adequate length of thumb; (3) there must be present an adequate length of finger or fingers to which the remaining length of thumb can become apposed. Many wounded hands are left without "pinch" function by reason of defects in one or more of these three factors; but provided the first factor is satisfied their "pinch" function can still be restored. A free thumb can be remade or adequately lengthened, or a rigid digit can be made to which the thumb element may be apposed. Discussing the reconstruction of an opposition digit, the author describes: the raising of a tube pedicle; the attachment of the pedicle to the hand; the detachment of the pedicle from the abdomen; the bone graft, and the aftercare.

British Heart Journal, London 9: 225-318 (Oct.) 1947

Heart Murmurs. W. Evans. -p. 225.
Repetitive Paroxysmal Tachycardia. J. Parkinson and C. Papp. -p. 241.
Case of Perforated Duodenal Ulcer and Cardiac Infarction. A. W. Branwood. -p. 263.
Paroxysmal Heart Block in Bundle Branch Block. W. Stokes. -p. 267.
First Heart Sound in Auricular and Ventricular Extrasystoles. P. Cossio, R. G. Dambrosi and H. F. Warnford-Thompson. -p. 275.
*Prognosis of Patent Ductus Arteriosus. J. Benn. -p. 293.
*Cardiac Catheterization in Cases of Patent Interauricular Septum, Primary Pulmonary Hypertension, Fallot's Tetralogy and Pulmonary Stenosis. Sheila Howarth, J. McMichael and E. P. Sharpey-Schafer. -p. 292.

Prognosis of Patent Ductus Arteriosus.—Benn reviews observations on 46 cases of patent ductus arteriosus, which he divides into two groups. Group A includes 30, all except 1 of which had been collected from a school cardiac clinic. This probably includes every case of patent ductus arteriosus among the younger people of Bristol, whether they had symptoms or not. Group B consists of 16 cases from areas outside Bristol referred in a few cases from school clinics but often because of symptoms. Thus group A forms a representative sample of the condition while group B approximates more nearly the type of case generally reported. The author gives particular attention to the 30 patients of group A. Here females predominate over males by more than two to one. The absence of bacterial endocarditis in group A suggests very strongly that it is much less common than has been described. Most patients lead a normal life, but many are below average weight. Bacterial endocarditis has become much less dangerous since the discovery of penicillin. Operation with its grave risks hardly seems justified merely for the prevention of the possibility of infection. However, patients cured of bacterial endocarditis appear to be proper subjects for operation as they are probably more liable to, or more exposed to, infection. In 2 cases the classic murmur disappeared without other evidence that the ductus arteriosus had closed. Precordial thrills sometimes vanish with increasing age. The diastolic blood pressure is usually normal. Pulmonary congestion is not so common as has been reported. The average body weight is significantly below normal. Operation is required in only a limited number of cases of patent ductus arteriosus. The following are indications for surgery: bacterial endocarditis, recovered bacterial endocarditis, cardiac embarrassment or poor physique.

Cardiac Catheterization in Patients with Intracardiac Shunts.—Howarth and her associates point out that the development of the technic of cardiac catheterization indicated a method for the detection of intracardiac shunts. They report data on patients that were suspected on clinical grounds of having intracardiac shunts. Samples of blood from the right auricle and right ventricle may be obtained by cardiac catheterization in cases of suspected cardiac shunts. Blood so obtained contains more oxygen than vena cava blood if the shunts is from left to right. Right to left shunts may be detected by a reduced arterial oxygen saturation in the presence of normally functioning lungs. Two of the 5 cases with patent interauricular septum showed a conspicuous increase in right auricular pressure with the shunt still left to right. A case with enlarged pulmonary arteries and a normal arterial oxygen saturation showed no evidence of a shunt and a greatly increased mean right ventricular pressure. A diagnosis of pulmonary hypertension was confirmed at necropsy. A case of Fallot's tetralogy showed an increased mean right ventricular pressure. The data suggested some left to right mixture of blood, although the main shunt was from right to left. A child with enlarged pulmonary arteries showed no evidence of a shunt. Mean right ventricular pressure was greatly increased and a diagnosis of pulmonary stenosis was made. A case of patent ductus arteriosus showed a greatly raised mean pulmonary arterial pressure, a considerably raised right ventricular pressure and highly oxygenated pulmonary arterial blood samples.

British Journal of Experimental Pathology, London 28: 377-448 (Dec.) 1947

Relation Between Serum Protein and Hemoglobin in 324 Indian Soldiers. H. Lehmann. -p. 377.
Development of Anthrax Following Administration of Spores by Inhalation. J. M. Barnes. -p. 385.
Vagaries of Agglutination-Inhibition Reaction with Newly Isolated Strains of Influenza Virus. C.H. Stuart-Harris and M.H. Miller. -p. 394.
Investigation into Production of Antibacterial Substances by Fungi. Preliminary Examination of Eighth 100 Species, all Basidiomycetes. M.H. Wilkins. -p. 416.
Licheniformin, Antitiotic Substance from Bacillus Licheniformis, Active Against Mycobacterium Tuberculosis. R. K. Callow, R. E. Glover, P. D. Hart and G. M. Hills. -p. 418.
Dehydrogenase Activity in Virus Infections. D. J. Bauer. -p. 440.

British Medical Journal, London

1: 333-378 (Feb. 21) 1948

Social Medicine in the Curriculum. J. B. Grant. -p. 333.
*Problem of Chilblains with Note on Their Treatment with Nicotinic Acid. R. J. Gourlay. -p. 336.
Hypothalamus and Pituitary Gland with Special Reference to Posterior Pituitary and Labor. G. W. Harris. -p. 339
Disorders of Nervous System Due to Malnutrition. H. S. Stannus. -p. 342.
Improved Direct Coagulase Test for Rapid Detection of Staphylococcus Aureus. I. Lominski and Erika Grossfield. -p. 343.

Nicotinic Acid in Treatment of Chilblains.--According to Gourlay the usual sites of chilblains are the dorsal aspects of the proximal phalanges of the hand, the plantar aspect of the toes, along the inner border and dorsum of the great toe, and in the region of the heel and achilles tendon. Chilblains may also occur on the ears, but in this site they resemble frostbite rather than a true perniosis. The gross pathology of the chilblain lesion is a vasoconstriction of the subcutaneous arteries and larger arterioles associated with a vasodilation of the superficial minute vessels. Having observed the vasodilator action of nicotinic acid, the author decided to use it in the treatment of the cold congested hands and noses from which so many young children suffer in the winter; the results were dramatic. The basic dose of nicotinic acid administered was for an adult 50 mg. and for a child 25 mg. thrice daily immediately after meals; this tended to reduce the incidence of flushing and caused a prolongation of the vasodilator action of the nicotinic acid. In severe cases the dose was increased, but in no case was it found necessary to give more than 300 mg. a day. Relapse was common when the nicotinic acid was withdrawn. Twenty-seven cases are reviewed. It is suggested that nicotinic acid is the method of choice in general practice owing to its ease of administration and its freedom from serious untoward effects.

Edinburgh Medical Journal

55: 1-64 (Jan.) 1948

Argument on Neural Tumors and Their Allies. W. F. Harvey. -p. 1.
*Psychologic and Social Aspects of Sydenham's Chorea. E.R.C. Walker. -p. 17.
Electro-Shock and Electronarcosis in Treatment of Mental Disorders. A. S. Paterson. -p. 39.
Esophageal Hiatus Hernia. A. W. Branwood. -p. 50.

Psychologic Aspects of Sydenham's Chorea.--Walker believes that the hardening of opinion in favor of a toxic infective theory of Sydenham's chorea which followed on the development of bacteriology, is unjustified. Certain sociologic factors in relation to 131 children treated for chorea in the Royal Aberdeen Hospital for Sick Children between 1930 and 1942 have been considered, and the influence of war conditions on the incidence of the disease in the northeastern part of Scotland. A more thorough and detailed investigation into the life circumstances of 42 of these children revealed that in every instance the child was subjected over a considerable period of time to conditions calculated to induce functional nervous disturbance. These results are shown to be similar to those of recent investigations of the same kind by pediatricians and to support the conclusion reached by many of these investigators that chorea is probably a psychologically determined disease.

Journal of Hygiene, London

45: 397-526 (Dec.) 1947. Partial Index

Morphological Appearances of Various Stages in B. Proteus and Coli. Emmy Klieneberger-Nobel. -p. 410.
Demonstration of Chromatinic Structures in Avian Tubercle Bacilli in Early Stages of Development. E. M. Brieger and C. F. Robinow. -p. 413.
*Note on Effects of Home Duties on Factory Employment of Women: Study of Absenteeism in Group of 144 Voluntary Factory Workers. D. C. Wilson. -p. 431.
Factors Affecting Warmth, Comfort and Stuffiness in Domestic Rooms. K. W. Yarnold. -p. 434.
Account of Health of Nurses at Westminster Hospital from July 1943 to July 1946. E. D. H. Cowen. -p. 443.
Variation, Diurnal and over Longer Periods of Time, in Blood Hemoglobin, Hematocrit, Plasma Protein, Erythrocyte Sedimentation Rate and Blood Chloride. E. T. Renbourn. -p. 455.
Suggested Repellent for Schistosome Cercariae. W. H. G. Atkins. -p. 468.
Epidemic Respiratory Infection in Rural Population with Special Reference to Influenza A Epidemics of 1933, 1936-7 and 1943-4. W. N. Pickles, F. M. Burnet and Norma McArthur. -p. 469.
*Occurrence of Foot and Mouth Disease in Hedgehog Under Natural Conditions. J. D. McLauchlan and W. M. Henderson. -p. 474.

Absenteeism in Women Workers.--Wilson studied factors leading to loss of working time in a group of 144 women factory workers. The majority were single women whose interests centered in their families. One third of these 144 women, owing to disability of some near relative, had home duties which were sufficiently heavy to interfere at times with their factory work; a contributory cause of absenteeism was ill health, ascribed by many workers to cold and draughty working environment. Examination of the factory records showed more than twice the rate of absenteeism due to certified sickness among women with home ties and responsibilities.

Foot and Mouth Disease in Hedgehogs.--McLauchlan and Henderson say that foot and mouth disease was observed in hedgehogs (Erinaceus europaeus) in connection with outbreaks of the disease among farm stock in Norfolk during the summer of 1946. It seemed probable that affected hedgehogs were responsible in some instances for spreading the disease to cattle.

Acta Medica Orientalia, Jerusalem

6: 371-394 (Dec.) 1947

*Antibiotic Bacterial Strains from Human Sources. R. Reitler and J. Boxer. -p. 371.
Clinical Remarks on Hypertension and Unilateral Kidney Disease. J. Kleeberg. -p. 382.
Errors of Refraction and Visual Efficiency. P. H. Boshoff and E. Jokl. -p. 384.

Antibiotic Bacterial Strains from Human Sources.--Reiter and Boxer have isolated three bacterial strains from human sources, which exhibited considerable antibiotic activity. One belongs to the Bacillus brevis group and proved antagonistic mainly to gram-positive organisms. It has been isolated from mesenteric lymph nodes with reticuloendothelial hyperplasia. An extract prepared from the culture was not only antibiotically active but stimulated also the reticuloendothelium in rabbits. Two strains of Pseudomonas fluorescens, predominantly antagonistic against gram-negative organisms were isolated from stools. The administration of living cultures to patients with enteric infections appeared to shorten the disease if the cultures were given after the bacteremic stage had passed but was without effect during this period of the disease

Archiv für Dermatologie und Syphilis, Heidelberg

186: 457-724 (Jan. 3) 1948. Partial Index

Experimental Studies on Epidermal Sensitization: I. Intraepidermal Dissemination of Eczematous Sensitization. K. W. Kalkoff. -p. 493.

*Diagnostic Importance of Eosinophil Blood Count for Detection of Intolerance for Arsphenamine. O. Kleifeld. p. 512.
Erythema Nodosum with Particular Attention to So-Called Symptomatic Forms in Venereal Diseases and After Sulfathiazole. A. Greither. -p. 525.
*Tuberculosis and Syphilis. Hilde Sczuka. -p. 553.
Protective Ferments in Nutritional Allergy. W. Gahlen. p. 580.
Bee Sting as Allergic Disease. G. Ackermann. -p. 596.
Water Sodium Chloride Exchange and Dermatoses. H. Koehler and O. Koenig. p. 669.

Eosinophils in Detection of Intolerance for Arsphenamine.—In investigating the problem whether the eosinophils in the blood are of value in the recognition of an intolerance for arsphenamine, Kleifeld directs attention to considerable margins of error with various methods of counting eosinophils. Clinical observations have revealed that neither immediately after nor during an injection of arsphenamine, alone or combined with bismuth, is there any causal relation to the behavior of the eosinophils. Increases, reductions or stationary eosinophil counts were found to be accidental. Consequently, control of the eosinophilic blood picture is of no value for the early recognition of intolerance for arsphenamine treatment and earlier reports to this effect are erroneous.

Tuberculosis and Syphilis.—Sczuka is concerned with the problem whether in case of concurrence of tuberculosis and syphilis the two processes exert influence one on the other. This problem is of vital importance at present, when, as a result of the war, both diseases are increasing. The author discusses similarities and differences between the two diseases with regard to the morphology, biology and dissemination of their causal organisms. She observed that the new, florid, open and exudative forms of tuberculosis promote the dissemination of the syphilitic organism in the body. Tuberculous processes of the skin and the mucous membranes become superinfected with syphilis. Conversely, secondary syphilis, inadequately treated syphilis and old syphilis with organic and visceral symptoms, such as tabes or paralysis, predispose a patient to the acquisition and dissemination of tuberculosis. The author proves this on the basis of literature reports and of 4 cases observed at a hospital in Hannover and presented in this report.

Maandschrift voor Kindergeneeskunde, Leyden

15: 403-434 (Dec.) 1947

*Epidemic of Meningomyeloencephalitis After Vaccination Against Smallpox. J.L. Keyzer and P.P.M. Nieuwenhuis. -p. 403.
Congenital Atresia of Esophagus. J. Ten Kate. -p. 417

Epidemic of Postvaccinal Meningomyeloencephalitis.—According to Keyzer and Nieuwenhuis 27 cases of smallpox occurred in Belgium in the spring of 1947. Because of this outbreak a large part of the population of the adjoining provinces of Holland (Limburg and N. Brabant) were vaccinated. In the course of these vaccinations 27 patients with postvaccinal encephalitis were admitted to the author's hospital. One patient presented the symptoms of a transverse myelitis. All patients had been vaccinated for the first time. The age varied between 7 and 16 years. The incubation period lasted 11.8 days on an average. Four severe cases are described. The clinical pecularities of all the 27 cases are tabulated. Two patients died. In the others no mental or physical defect remained. The morbidity was very high: one case of encephalitis occurred among 700 vaccinations. The authors recommend compulsory vaccination for children under eighteen months.

Medicina, Mexico, D. F.

28: 73-94 (Feb. 25) 1948. Partial Index

*Virginal and Gravidic Hypertrophy of Mamma. A. Diez de Urdanivia M. and D. Gutierrez Garcia. -p. 78.

Virginal Hypertrophy of Breasts.—The condition is rare. It occurs in adolescent girls and in young pregnant women. It is due to special reactivity of the breast to hormonal stimulation. Hypertrophy can be limited to one or several lobes of the breast or be diffuse. In either type the breast grows rapidly. It is painless and soft on palpation. The treatment consists of simple mastectomy followed by plastic surgery. In the limited type of the disease, partial mammectomy followed by plastic surgery is indicated. The histopathologic picture is similar to that of diffuse fibroadenoma. A case in a Negro girl of 13 years of age is reported. Hypertrophy began with appearance of menstruation at the age of 12 years. "Perandren" failed. Within one year the breast was larger than the head of the patient. The histopathologic study of the removed breast confirmed the clinical diagnosis of hypertrophy in adolescent girls.

Nederlandsch Tijdschrift v Geneeskunde, Amsterdam

92: 1-76 (Jan. 3) 1948. Partial Index

*Experiences with Retropubic Prostatectomy According to Terrence Millin. F. H. Van Gulik. -p. 9.
Treatment of Diphtheria Bacilli Carriers with Local Application of Penicillin. W. H. Borst. p. 12.

Retropubic Prostatectomy According to Terrence Millin.—Van Gulik reviews the literature on retropubic prostatectomy according to Terrence Millin and says that he himself has performed this operation on 50 patients, of whom 33 could be reexamined. On the basis of his results he concludes that this method should not be compared with the transvesical method of Freyer. He thinks that Millin's retropubic prostatectomy should be used for enlarged prostates and that transurethral resection should be reserved for small prostates. He reemphasizes that Millin's method should be executed only by surgeons well schooled in urologic surgery, not by general surgeons who only now and then operate on the prostate.

Nervenarzt, Heidelberg

18: 433-480 (Oct.) 1947 Partial Index

Organic Disease and Neurosis. H. Goppert. -p. 437.
Concept of Character. U. J. Wassner. -p. 441.
*Centrally Caused Disturbances of Blood Pressure, Respiration and Basal Metabolism After Encephalitis. R. Frowein and G. Harber. -p. 444.
Addiction to Ether. H. von Keyserlingk. p. 450.
Arteriographically Demonstrable Disturbances in Cerebral Blood Perfusion as Chronic Sequel After Cranial Injury. T. Riechert. -p. 453.

Postencephalitic Disturbances in Blood Pressure, Respiration and Metabolism.—Frowein and Harber present the history of a man, aged 30, who during his army service on the Russian front had contracted typhus, which became complicated by encephalitis. Subsequently he had frequent attacks of cerebral convulsions, which became more frequent in spite of antiepileptic treatment. He also had disturbances in blood pressure, pulse rate, respiratory rate, heat regulation, sweat secretion and basal metabolic rate. Investigation of these disturbances made it evident that the considerable increase in the basal metabolic rate was not caused by hyperfunction of the thyroid but was of central origin. The authors cite observations of W. R. Hess, who in

studies on the hypothalamus found that the sphere which regulates the circulation coincides largely with that regulating the respiration. Both form a systemic aggregate, and there are connections with the centers of the other sympathetic functions. This indicates that the diencephalon is organized not so much according to organs but according to functional aims. Many functional aims are accomplished by the simultaneous activity of several sympathetic organ systems. This may explain the close connection between the various functional disturbances observed in the present case.

Nordisk Medicin, Gothenburg

37: 1-50 (Jan. 2) 1948. Partial Index

Pneumonia Treatment Before and After Introduction of of Penicillin. H. S. Mathisen. -p. 1.
Antipneumolysin Titer (APL) in Serum. N. Oker-Blom. -p. 4.
*Roentgen Treatment of Peritendinitis Calcarea of Shoulder. E. T. Madsen. -p. 7.
Hygienic and Bacteriologic Examination of Men's Hairdressing Salons in Bergen. H. Saxholm. -p. 15.
Significance of Exogenic Factors in Origin of Strabismus. O. Heinonen. -p 22.
Diagnosis of Omental Adhesions to Anterior Abdominal Wall. New Objective Clinical Symptom. K. Strav. -p. 29.
BAL Therapy in Gold Dermatitis. G. Edström. -p. 30.
Bleeding From Lateral Part of Nasal Cavity. Method of Treatment. W. Behrman. -p. 31.

Roentgen Treatment of Peritendinitis Calcarea of Shoulder.—Madsen found this disorder in 81 of 701 patients with painful shoulder examined. There were perhaps more cases, as the importance of roentgen examination with the arm in internal and in external rotation, with comparative pictures of both shoulders, was not recognized at the start. It is an affection of the shoulder with roentgenologically demonstrable calcium deposits in the soft parts. It appears more often on the right side, which testifies somewhat to traumatic etiology, and seems to be mainly a disease of middle and later life, in which occupation plays no part. The clinical symptoms and positive roentgen results establish the diagnosis. In latent cases roentgen examination accidentally reveals a calcification in the soft parts; clinical symptoms often develop later. Peritendinitis calcarea of the shoulder is regarded at least in the acute stage as a clinical entity. Roentgen therapy is an effective and relatively inexpensive method of treatment of a painful and disabling disorder and the results surpass those attained by other methods of treatment.

Paris Médical

1: 49-68 (Jan. 24) 1948. Partial Index

Dermatology and Syphilis in 1947. F. P. Merklen and P. De Graciansky. -p. 49.
*Falsely Positive Reactions in Syphilis. R. Demanche. -p. 61.
Treatment of Cancer of the Skin. R. Degos. -p. 55.

Falsely Positive Reactions in Syphilis.—Demanche agrees with those American authors who do not consider the serologic tests as strictly specific for syphilis, but he stresses the point that falsely positive reactions are exceptional. Falsely positive biologic reactions are nearly always incomplete, dissociated and weakly positive. The Bordet-Wassermann is usually negative; only the Kahn and the Meinicke test may show a partial flocculation. Moreover these false reactions may be temporary and may disappear after weeks or months. Occasionally the false reaction may be permanent and definitely positive; those are the extremely rare cases depending on the serologic constitution of the patient for which Kolmer has coined the term "biologic type." False reactions present a risk which can not be avoided completely, but which can be reduced by serial serum tests which may be repeated weekly or monthly and carried out by two or three laboratories for control purposes; in addition an analysis of the cerebrospinal fluid may be done in certain cases. One should also keep in mind that the serum reaction presents only a symptom and, therefore, it should never be considered as pathognomonic. In cases in which for certain reasons antisyphilitic treatment cannot be postponed, it should be practiced by means of drugs which do not involve any risk, and the patient should be informed that this treatment presents only a test and does not imply a definite diagnosis. In case of premarital examination a person examined may be permitted even to marry provided that his or her nervous system is normal and that the usual precautions are prescribed for the event of pregnancy. The serum reactions although not infallible are of great value and are indispensable. The serologic results should always be considered together with the clinical picture and interpreted in its light.

Prensa Medica Argentina, Buenos Aires

34: 2405-2450 (Dec. 19) 1947. Partial Index

*Rheumatic Stigma in Endocardium and Myocardium of Apparently Non-Rheumatic Hearts. R. Barahona and M. Gorena N. -p. 2407.

Rheumatic Lesions in Endocardium and Myocardium of Apparently Non-Rheumatic Hearts.--Barahona and Gorena studied 230 hearts removed postmortem from nonselected adults of both sexes. The majority of the patients died between the ages of 21 and 60 years. The method of study consisted in injecting the heart through the coronaries with a 10 per cent colored gelatin solution. The injections were made in non-autopsied heart at a temperature of 36 C. The valvular endocardium and the myocardium were studied microscopically after injections. Thirty hearts with rheumatic valvular deformities were used as controls. Two hundred hearts were apparently non-rheumatic. Vascularization of the cusps, and inflammation or healed inflammatory lesions of the valvular endocardium were encountered in the thirty rheumatic hearts (100 per cent) and in 43 (21.5 per cent) of the 200 normal hearts. Rheumatic lesions were encountered in the myocardium of the thirty rheumatic hearts (100 per cent) and in 80 of the apparently non-rheumatic hearts (40 per cent). Myocardial rheumatic lesions were present in the 43 apparently non-rheumatic hearts whose valvular cusps presented vascularization (100 per cent), and in 37 of the apparently non-rheumatic hearts whose valves presented no vascularization (24 per cent). The authors conclude that the presence of vessels in apparently normal cardiac valves is of pathologic significance and is of rheumatic etiology. Rheumatic disease frequently appears in a given community and produces slight changes in both the endocardium and in the myocardium.

Revue Médicale de Liège

3: 49-68 (Feb. 1) 1948. Partial Index

Systolic Murmur Due to Obstruction of the Aortic Orifice. C. Lian. -p. 49.
*Xerophthalmia in Suckling Infants and Hepatic Insufficiency. R. Weekers and R. Houet. -p. 57.

Xerophthalmia in Infants.—Weekers and Houet report 2 cases of xerosis and keratomalacia in male infants aged 3 and 3 and a half months respectively. The first patient was one of twin brothers both of whom received the same food; their intes-

tinal absorption of vitamin A was satisfactory. One of the twins developed a severe icterus; flocculation and serum coagulation tests revealed a severe lesion of the hepatic parenchyma. The xerophthalmia occurred within one month after the icterus. The other twin did not present any liver or eye symptoms. Sixty-thousand units of vitamin A were given daily to the patient; the conjunctival xerosis subsided completely and the keratomalacia improved. The second patient was a premature infant who presented signs of insufficiency of the liver which was enlarged; the urine contained urobilin. The diet of the infant did not seem to be deficient and the intestinal absorption of the liposoluble vitamins was satisfactory. The bilateral keratomalacia was severe, but cicatrization of the corneal lesions resulted from the administration of 60,000 units of vitamin A three times a day. The eye lesions of both patients were not due to an alimentary deficiency or to failure of intestinal absorption of vitamin A. It is suggested that failure of conversion of carotene into vitamin A in the hepatic parenchyma was responsible for the occurrence of the xerophthalmia.

Sang, Paris

18:521-592 (No. 9) 1947. Partial Index

*Correction of Anemia Due to Protein Deficiency, Effect of Casein, Antipernicious Hepatic Factor and Folic Acid Administered at Various Levels. A. Aschkenasy and P. Aschkenasy-Lelu.—p. 544.

Anemia Due to Protein Deficiency.—The Aschkenasys produced in rats a severe hemolytic anemia with considerable erythroblastic reaction in the bone marrow and with terminal normoblastosis of the blood associated with leukopenia and lymphopenia, by placing the animals on a diet completely lacking proteins for fifty to sixty-five days. The rats were then placed on a diet containing casein, antipernicious liver extracts and folic acid. Follow-up of the weight of the animals and blood studies were carried out for thirty to fifty days. Results showed that even far advanced anemia may subside completely provided the animals are placed on a diet which contains proteins in sufficient amounts. Thirty per cent is to be considered the optimum level of casein. The correction of the anemia manifests itself by a considerable increase in reticulocytes, which usually occurs about the fifth day of the protein regimen and which may be associated with a normoblastic discharge and the sudden occurrence of global leukocytes. The administration of liver extracts alone proved ineffective in anemia due to protein deficiency. The combined administration of casein and liver extracts, and particularly the parenteral administration of liver extracts for several days before that of casein, caused an increase in weight which was particularly evident at 7 per cent levels of casein but also occurred at 15 per cent levels although it was less. Hemopoiesis was not observed on a diet containing casein at 15 per cent levels, while the reticulocyte discharge and the synthesis of the hemoglobin were definitely activated at 7 per cent levels of casein. Correction of anemia and of leukopenia may be obtained in the absence of folic acid. The final resumption of weight gaining and hemopoiesis proves that this intestinal synthesis of microbic origin may be reestablished by the continued supply of proteins.

Schweizerische medizinische Wochenschrift, Basel

78:25-48 (Jan. 17) 1948. Partial Index

*Clinical Aspect and Differential Diagnosis of Broncnial Adenoma. A. Kappert.—p. 26.

Bronchial Adenoma.—Kappert reports 3 cases of bronchial adenoma in 1 woman aged 53 and in 2 men aged 27 and 21, respectively. Three stages of the disease may be recognized. Hemoptysis is the most important symptom of the first stage. Recurrent pleuropulmonary disturbances resulting from bronchial stenosis characterize the second stage, and exudative pleurisy may often be responsible for an erroneous diagnosis of tuberculosis. Suppurative complications such as pulmonary abscess, gangrene, bronchiectasis and empyema may occur in the third stage. Diagnosis of bronchial adenoma will best be made with the aid of bronchoscopy. Surgical treatment is indicated. As a rule, endobronchial removal of the tumor should be done first. Improvement in the clinical aspect may often result from the partial removal of the tumor for microscopic examination, but removal of the entire tumor must be the aim of the final endobronchial intervention. Lobectomy and pneumonectomy may be required in cases in which endobronchial removal of the tumor is not feasible or is contraindicated. The author's first patient presented the second stage of the disease and recovery resulted from endobronchial removal of the tumor. In the second patient the correct diagnosis was made with the aid of bronchoscopy during the third stage when a pulmonary abscess was present. Treatment with penicillin was instituted; temperature was restored to normal and the pus was expectorated. Closure of the bronchus by the adenoma may be considered as a protection against new inflammatory bouts. Complete endobronchial removal of the tumor was not feasible in the third patient, who presented a pulmonary abscess and empyema of the pleura complicating the third stage of the disease. Recovery resulted from lobectomy.

78:73-96 (Jan. 31) 1948. Partial Index

Protrusio Acetabuli (Otto-Chroback Pelvis). K. Nievergelt.—p. 31.
Treatment of Fracture of Shafts of Forearm. K. Lenggenhager.—p. 25.
*Tonsillectomy in Carriers of Diphtheria Bacilli. K. Graf.—p. 75.

Tonsillectomy in Carriers of Diphtheria Bacilli.—Graf stresses that in evaluating methods for the eradication of the carrier state in diphtheria it should always be considered that up to the eighth week after the attack the bacilli disappear spontaneously in the majority of cases and the term carrier is justified only for those who retain the bacilli longer. In such case pathologic processes generally exist in the mouth or nose. Chronically inflamed or hyperplastic pharyngeal and palatine tonsils play an important part, since there bacilli find breeding places, which are not reached by disinfection of the surface. Tonsillectomy and if necessary adenotomy usually counteract the carrier state, but remnants of adenoids and tonsils may result in failure. Ozena likewise may nullify the results of tonsillectomy, since the bacilli may continue to grow under the crusts and on the impaired mucosa. If the general condition is impaired, if patients are afraid, or the tonsils are not definitely implicated, an intervention should not be made before the eighth week has elapsed and efforts should first be made to obtain cure by conservative methods such as treatment with artificial fever or with penicillin. The latter can be applied either by injection, locally, by nasal inhalation or spray. If there is a history of repeated attacks of tonsillitis, or of peritonsillar abscesses, and if the tonsils are definitely diseased and the adenoids decidedly hypertrophied, the operation may be performed during the third or fourth week.

Book Notices

Advances in Military Medicine Made by American Investigators Working Under the Sponsorship of the Committee on Medical Research. Edited by E. C. Andrus and others. Associate editor: Tuckerman Day. Foreword by Alfred N. Richards. No. 4, Science in World War II, Office of Scientific Research and Development. In two volumes, Cloth. Price, $12.50. Pp. 472, with 62 illustrations; 473-900, with 63-94 illustrations. An Atlantic Monthly Press Book. Little, Brown & Co., 34 Beacon St., Boston 6, 1948.

These two volumes comprise a record of results of the great cooperative effort in medical research conducted in the interests of national defense by the Office of Scientific Research and Development during World War II. The record is necessarily incomplete and lacking in technical detail. The definitive records can be found in medical and scientific journals and monographs in which more than 1,300 papers have been published and in which hundreds more will appear. In the foreword Dr. Alfred N. Richards, chairman of the Committee on Medical Research, outlines the organization and administration of that Committee, which President Roosevelt established by executive order on June 28, 1941. The Committee on Medical Research was a constituent agency of the Office of Scientific Research and Development, and it obtained vital assistance from the division of medical sciences of the National Research Council. The Committee on Medical Research by 1943 had fifty-two committees with a total membership of 297; in addition it had liaison with the armed services and many other groups. The Committee on Medical Research was legally empowered to recommend the expenditure of government funds, which the National Research Council, not being a government agency, could not do, and thus to finance numerous scientific projects. The National Research Council considered 951 proposals for research, of which 638 were approved and transmitted to the Committee on Medical Research; of these, 501 became the basis of contracts for investigations. In addition, 90 proposals were recommended and approved by the director of the Office of Scientific Research and Development without prior consideration by the National Research Council's Committees. The contracts thus entered into involved one hundred and thirty-five universities, hospitals, research institutes and industrial firms, and the sums expended on these researches amounted to about $25,000,000.

In these two volumes the fields of research involved in this great undertaking are discussed. The reports already published are tabulated, as are the subjects of the numerous contracts. Dr. Richards points out that in most cases financial loss to the nonprofit institutions was avoided. However, there can be no question, he said, of the strain put on many of the investigators who were obliged to carry on their teaching duties at an accelerated tempo at the same time.

Following the Normandy invasion in 1944, the director of the Office of Scientific Research and Development began planning to terminate its activities, and from the beginning of 1945 the Committee on Medical Research was not encouraged to make new commitments other than those of short range and practical usefulness. The military services were then given the opportunity to take over under their own contracts any investigations that were of special interest to them, and about one hundred contracts were transferred.

A partial list of subjects discussed in these volumes includes blood substitutes, the history of plasma fractionation, burns, tropical diseases, shock, motion sickness, crash injuries, wound ballistics, insecticides, insect repellents, DDT, antimalarial drugs, the development of penicillin, nutrition, chemical warfare agents and acclimatization to hot and cold. An extensive bibliography and index are included.

Animal Genetics and Medicine. By Hans Grüneberg, Ph.D., M.D. With a foreword by Sir Henry Dale, O.M., G.B.E., F.R.S. Cloth. Price, $5.50. Pp. 296, with 33 illustrations. Paul B. Hoeber, Inc., 49 E. 33rd St., New York 16, 1947.

The author has carried on extensive research on the role of hereditary factors in the development of laboratory rodents, especially the mouse. He previously published a book entitled "The Genetics of the Mouse." He has, in addition, a long list of papers to his credit which deal primarily with new mutation or inherited variations in the laboratory mouse. He may therefore be considered well grounded in the subject which he develops. The last short paragraph of the book reads as follows: "The study of inherited diseases in animals is a new branch of medical science. If this book will convince a few people of the value of this new tool for aetiological studies it will have fulfilled its purpose." This paragraph states in essence the content and purpose of the book.

After three introductory chapters on general principles, the author devotes six chapters to a discussion of inherited variations of the central nervous system as shown by studies on laboratory rodents The specific topics of these six chapters include: pseudencephaly, encephalocele and spina bifida, syringomyelia, corpus callosum, otocephaly, hydrocephaly, spastic spinal paralysis, shaking paralysis, ataxia, epilepsy and audiogenic seizures. Brief attempts are made to relate these to similar affections in the human being. The next twelve chapters concern the ear, eye, endocrine organs, blood, skeleton, digestive system, urogenital system and the skin. Chapter XXIII deals with the subject of serology as it pertains to the laboratory rodent. The K and H systems in the rabbit are discussed as is the inheritance of the capacity to develop anti-M and anti-N serums by rabbits. Short paragraphs deal with xanthine oxidases and esterases in mice. In the chapter on Disease Resistance the author discusses briefly the inheritence of resistance to bacterial toxins, bactericidal powers of the blood, leukocyte levels and resistance, and organ response to resistance. He closes this chapter with the statement "It will be obvious to the reader of this book that results of this general kind are the real essence of research into disease resistance ....It does not appear unduly sanguine to hope that the results obtained in animals may, in some cases at least, be found applicable in human beings. For a relation, once critically demonstrated in animal material, should be verifiable in many cases even in the subject of casual and formal genesis of diseases."

In the introductory chapters the author discusses man. He calls attention especially to an apparently common point of view among investigators, namely, that a disease with a hereditary basis belongs in a mysterious category of diseases which do not lend themselves to exploration. He emphasizes properly, as many geneticists have previously, that genes act only through physiologic channels and that their actions are as subject to investigation as are the effects of bacteria or any other causal factor. Objections could be raised to some of the author's opinions regarding a few general questions, but these objections are minor. The book is a laudable attempt to call to the attention of the medical investigator some of the information that is a-

vailable regarding the inheritance of diseases among laboratory mammals. The book is written in a nontechnical style and should be understandable to anyone with a general biologic background. It may be recommended highly to medical investigators, and even to general medical practitioners.

Neurological Complications After Spinal Anesthesia and Results, from 2493 Follow-up Cases. By Gunnar Thorsen. Translated by Ulla Schott. Acta chirurgica Scandinavica. Vol. XCV, Suppl. 121. Paper. Price, 15 kronor. Pp. 272, with 11 illustrations. P.A. Norstedt & Soner, Tryckerigatan 2, Stockholm 2, 1947.

The following quotation from the author's preface and introduction are pertinent!

> When a medical method, whether diagnostic or therapeutic, has been generally recognized it easily becomes a matter of routine, being deprived of unceasing critical observation. Indications and contra-indications become blurred. Results are misjudged. Limitations and risks are forgotten. It therefore becomes imperative to analyze now and again the results arrived at, as well as, the risks and indications of the methods employed....I assumed, to begin with, that these complications (neurological) were rare and, therefore, almost negligible (after spinal anesthesia). I have come to the opposite conclusion.

The author send out 3,335 questionnaires to persons who had received spinal anesthesia at the Central Hospital in Orebro during a period of three years. Replies were received from 2,493 (74.7 per cent). Modified questionnaires were sent to 120 persons who had been subjected to diagnostic lumbar puncture only, and 100 replied. Analyses of these questionnaires form the basis of the monograph. In addition, reports of physical examinations of patients who complained and autopsies of those who died after spinal anesthesia are included, together with case reports from other institutions and certain experimental data. An extensive review of the literature accompanies the various sections of the monograph. The exhaustive and scholarly classifications of the signs and symptoms encountered is accompanied in each case by logical attempts to explain mechanisms, and these are supported by experimental evidence in many cases. Details of the major discussions cannot be referred to in such a review as this. Causative factors are divided into effects due to (*a*) direct trauma from the puncture needle, (*b*) leakage of spinal fluid, (*c*) infection and (*d*) the anesthetic agent itself. The following quotations are from the author's discussion of the effects of the agent:

> In all the "primary neurogenous" forms the changes of the cerebro-spinal fluid are insignificant or lacking altogether. ...The aseptic meningitis generally sets in on the third to fourth day, often being preceded by prodromes such as headache, etc. It is, as a rule, benign. The arachnitis is characterized by a free interval of days or years between the spa (spinal anesthesia) and the onset of the symptoms....Their occurrence is far more common than is generally thought and the number of the true injuries may be estimated in the present material at a minimum of 1/200. Symptoms, such as a feeling of weakness in the legs, have however been reported in 7.0 per cent and numbness in the legs in 13.3 per cent in the questionnaire material. ...Injuries to the nervous substance and membranes are highly dependent on the concentration of the anaesthetic solution. They are equally common after novocaine (procaine) and percaine (dibucaine) anaesthesia. The weakest possible solutions should, therefore, be chosen with due regard to isotonia and reaction.

A brief review of this valuable and informative piece of work cannot do it justice. It deserves careful reading and consideration by every anesthetist and every surgeon, whatever may be the technic which they use. Perhaps there may be stimulated, as a result, a series of similar thorough studies in this country, with a corresponding awakening to the imperfections of our results. The work seems to suffer considerably in arrangement and in translation. It is, however, an outstanding contribution to the literature of spinal anesthesia.

Die Skelettvarietäten des Fusses: Ihre klinische und unfallmedizinische Bedeutung. Von Dr. Theo Marti, Spezialarzt für Chirurgie F.M.H., Kreisarzt der Schweizerischen Unfallversicherungsanstalt an der Hauptagentur in Genf. Heft 2, Praktische Beiträge zur Orthopädie, herausgegeben von Prof. Dr. Hans Debrunner und Prof. Dr. Max R. Francillon. Paper. Price, 14.20 Swiss francs. Pp. 164, with 58 illustrations. Hans Huber, Marktgasse 9, Bern 16, 1947.

The author's observations are based on many months of experience in the hospital of the Swiss Traumatic Surgical Insurance Association. Variations from the normal forms of the skeletal system are not unusual in the hands and feet. They occur as supernumerary elements or as fusions of normally independent skeletal segments. Other varieties occur in relation to form, size and type of individual bones, either by partial malformations or by variations in normal positions.

The interpretation of roentgenograms with accessory bone elements following trauma may be difficult. These elements may be mistaken for fractures or arthritic changes. Likewise, the reverse may be true. When judging traumatic surgical cases, a mistake may have serious financial and social consequences. For that reason, correct differential diagnosis is necessary. The complexity of the problem is well known. While these varieties were considered at one time to be "sports of nature," there may be a connection, for example, between the accessory tarsal segments and arthritis deformans. Static complaints on the part of the patient may produce localized symptoms. Some accessory bones have a close relationship to deformities of the foot. The presence of accessory tarsal bones favors distortions.

The accessory, skeletal elements themselves may be subjected to pathologic changes or may be the sites of isolated traumatic injuries. The knowledge of these changes is important from a therapeutic point of view, but also in determinations of traumatic medical judgment.

The complex problems of accessory tarsal elements are discussed, and literature on the subject is evaluated. Most of the reports in the literature are on a case history basis. They are described here in three sections. The first section describes the problem of foot variations in general, based on anatomic, morphologic, static and roentgenologic descriptions in the literature. The second section concerns the well known variations; the accessory tarsal elements and synostoses are described in detail and reference is given to our knowledge of changes and anomalies of sesamoid bones. In the third section, the author analyzes foot variations in relation to legislation in the Swiss traumatic surgical laws.

Traccion esqueletica. Por Carlos E. Ottolenghi, profesor adjunto de ortopedia, Buenos Aires. Fabrikoid. Pp. 733, with 672 illustrations. Libreria y editorial "El Ateneo," Florida, 340--Cordoba, 2099, Buenos Aires, 1946.

This monograph is a historic document of keen interest to students and practitioners alike. Unfortunately, it is not available in English. The author's qualifications are excellent, and he is well known to orthopedic surgeons, particularly in this hemisphere. The book fills a need. The contribution is of the highest quality. Although it may be criticized for being too comprehensive, it is an

excellent reference book. This profusely illustrated work is a comprehensive study of skeletal traction. The historical background, including the controversy on priority, is given as far back as Codivilla and Steinmann.

The evolution of the method is carefully presented, emphasizing the necessity for special equipment. Ottolenghi summarizes his long experience and the mechanical investigations which he has pursued regarding the instruments he considers best, including a stirrup of his own design. The reaction of soft tissues and bones around pins and wires was studied from the clinical point of view and supplemented by experimental work on dogs and rabbits. A specially trained hospital staff is an important factor in obtaining excellent results. Use by inexpert operators is the cause of many failures. These failures are due to errors in technic.

There are two dangers inherent in the method: infection and the possible delay in consolidation. The first is easily avoided if all the prerequisites of asepsis and antisepsis are maintained. Delay in consolidation is due to the use of excessive traction. The importance of repeated roentgenographic control is emphasized. Continuous traction for a prolonged period preventing contact of the fragments will bring about the formation of fibrous tissue. Proper traction avoids secondary displacement and aids consolidation, because the forces of concentric pressure which act on the area bring about the formation of bone callus. The author maintains that skeletal traction applied with correct technic and precise indications is perfectly tolerated. Many interesting technical problems are referred to in the special section where all technics are analyzed and end results are shown. Ottolenghi believes that recent advances in the treatment of fractures will lessen the indications for skeletal traction. The book is accurately documented and a large bibliography is appended.

The Problem of Cerebral Palsy Today. By M. A. Perlstein, M.D. Prepared with the assistance of William McPeak. Paper. Pp. 57, with illustrations. Distributed by the National Society for Crippled Children and Adults, 11 S. La Salle St., Chicago; Published by Association for the Aid of Crippled Children. 580 Fifth Ave., New York, 1947.

In this paper-bound brochure are assembled the facts about crippling due to cerebral palsy Reasons for neglect of the palsied are: (1) ignorance that they can be helped on the part of (*a*) the physicians, (*b*) the patients and their families and (*c*) society as a whole; (2) the belief that all palsied persons are mentally defective; (3) superstition, (4) the idea that the palsy is a manifestation of some family taint; (5) the broken family situations, usually with child rejection; (6) the expense of treatment; (7) the lack of facilities for treatment; (8) the lack of an emotional appeal to the layman corresponding to that of an acute epidemic disease like poliomyelitis or smallpox, and (9) the philosophy that "only the fit should survive." This should be a valuable booklet for teachers and parents and should not be neglected by physicians. While it is not expected that physicians will personally supervise the details of care and particularly the education of the spastic person, it is of utmost importance that they understand and make the best possible use of their co-workers in the care of the spastic child, namely, the teacher and the parent. All educators should be familiar with the problems involved. This little booklet is an excellent summarization of what they need to know.

A Text-Book of Gynaecology for Students and Practitioners. By James Young, D.S.O., M.D., F.R.C.S.E., Professor of Obstetrics and Gynaecology, University of London, London. Seventh edition. Cloth. Price, $7.50. Pp. 471, with 277 illustrations. The Macmillan Company, 60 Fifth Ave., New York 11; Adam H Charles Black, 4, 5, & 6 Soho Sq., London, W. 1., 1947.

In the seventh edition of this popular book changes were made particularly in the chapters on sex endocrinology, menstrual disorders, sterility, leukorrhea, pain and backache.

In the endocrine therapy of dysmenorrhea, Young prescribes 9.5 mg. diethylstibestrol daily for the ten days before the onset of menstruation. Nearly all American Gynecologists who prescribe this drug for the relief of painful menstruation tell their patients to take the tablets for fifteen or twenty days beginning shortly after the onset of bleeding. The theory is that such medication inhibits ovulation and thereby relieves pain at the next menses. How the administration of diethylstibestrol during the last ten days controls dysmenorrhea is not clear. In the chapter on leukorrhea there is no mention of moniliasis. In fact, the only discussion of this condition is in the chapter on inflammation of the vulva and vagina, where the word thrush is used. There is one illustration of monilia vulvitis in a case of diabetes mellitus. Monilia infection is encountered frequently enough to warrent at least a paragraph on the symptomatology, diagnosis and treatment.

The use of the roentgen ray is recommended for leukoplakia vulvae where estrogens fail, but roentgen therapy seldom improves this condition. Also, it must be emphasized that estrogen therapy should not be continued for too long because cancer develops in a high percentage of cases of leukoplakia vulvae.

In cases of vaginal inflammation the author still finds tampons soaked in ichthammol in glycerin useful. He believes that the cervix can be a focus of serious infection. He relieves pains of the iliac fossa by injecting 85 per cent alchol or "proctocaine" into the Frankenhauser sympathetic plexus.

The section on special tumors of the ovary is excellent and ample. Only thirty-two pages are devoted to operative gynecology. This section should be either enlarged considerably or omitted entirely.

The book is well written and abundantly illustrated. However, seven illustrations are used in two different sections (figures 103, 113, 120, 121, 122, 136 and 236). In spite of the foregoing criticisms, the book will prove to be most useful to students and practitioners because it contains sound advice on all gynecologic problems. This is to be expected, because Young is one of the foremost gynecologists in the world.

A Text-Book of Bacteriology. By R.W. Fairbrother, M.D., D. Sc. F. R.C.P., Director of the Department of Clinical Pathology, Manchester Royal Infirmary, Manchester, England. Fifth edition. Fabrikoid. Price $6. Pp. 480, with 6 plates. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1948.

The fifth edition of this book was issued in September 1946 and reprinted in the United States in January 1948. The book is an outline of the medical aspects of bacteriology and therefore is not documented with references to the original literature. Obsolete material has been removed and an attempt made to bring the subject material up to date. Although a section on penicillin is included, no mention is made of streptomycin or other antibiotics. This may be explained on the basis of the revision date. This book should save much time for the medical student by avoiding controversial issues and presenting only the essential facts in the field of medical bacteriology.

Case Histories in Clinical and Abnormal Psychology. Edited by Arthur Burton, Associate Professor of Psychology, Willamette University, Salem, Ore., and Robert E. Harris, Associate Professor of Medical Psychology, University of California, San Francisco. Cloth. Price, $4. Pp. 680, with illustrations. Harper & Brothers, 49 E. 33d St., New York 16, 1947.

This multiple authored book contains case histories of a wide variety of psychologic disorders written by forty-one psychologists and four psychiatrists. The editors state that their purpose has been twofold: "first, to present examples of most of the personality and behavior disorders; and second, to exhibit the work of competent clinician". The medical reader may think that "clinician" means a psychologist working in his traditional functions of diagnostic testing with patients, but he will find that a psychologist as a clinician is a psychotherapist. Several case histories indicate the therapeutic role of the psychologist and one of them, entitled "Nondirective Counseling," demonstrates the "echo" technic of that school. An introduction by Henry A. Murray covers twenty pages and demonstrates his erudition by rambling somewhat incoherently through a discussion of many distantly related facts. When he comes down to a real introduction, Murray indicates the essential criticisms of this work. Some case histories contain too few important facts and are more descriptive than interpretive. Important dynamic material is not at hand to give awareness of unconscious needs and frustrations. However, the case histories are well chosen to indicate the significance of many important tests in the overall diagnosis and therapy of the mentally ill.

History of Medicine: A Correlative Text, Arranged According to Subjects. By Cecilia C. Mettler, A.B., Ed.B., A.M. Edited by Fred A. Mettler, A.M., M.D., Ph.D., Associate Professor of Anatomy, College of Physicians and Surgeons, Columbia University, New York. Fabrikoid. Price, $8.50. Pp. 1215, with 16 illustrations. The Blakiston Co., 1012 Walnut St., Philadelphia 5, 1947.

Dr. Mettler emphasizes as the purpose of this book the providing of a sense of perspective in facilitating the study of the history of medicine, emphasizing the fundamental value of important medical principles and establishing a feeling of proportion among the component fields of medicine. The student is supplied with an introduction to the principles underlying the development of the various fields embraced in the medical curriculum and an opportunity to become familiar with men who have contributed outstandingly to the progress of the medical sciences. The text is divided into chapters containing the history of a particular subject, with the idea that history of each subject may be studied concurrently with the present day texts. While for these purposes the book will undoubtedly be valuable to the student, as history it lacks unity of presentation of period and integration philosophically with the changing culture of the times. The author has been so precise in attempting to give due credit to the many individual names significant in the historical development of the several branches of medicine that the reading frequently becomes dull. Nevertheless, this same emphasis makes the book excellent for reference.

In many medical schools, after a preliminary period of enthusiastic acceptance of the teaching of the history of medicine, a failure to continue occurs, attributable to lack of systematization. With this in mind, the author has attempted an objective presentation of the verifiable facts from the time of primitive man through the nineteenth century, dividing the history into fifteen sections, including anatomy, physiology, pathology, bacteriology and the several specialties. For teaching the history of medicine in medical school the volume will find considerable acceptance and additionally will serve as an excellent reference to persons prominent in the development of medicine from early times.

New Fields of Psychiatry. By David M. Levy, M.D., Assistant Professor of Psychiatry, College of Physicians and Surgeons, Columbia University, New York. Cloth. Price, $2.75. Pp. 159. W. W. Norton & Co., Inc., 101 Fifth Ave., New York 3, 1947.

This is a brief, personal, interesting and authentic account of psychiatry as it finds application in diverse fields of human affairs. The author has been identified with the development of psychiatry in child guidance and in the field of delinquency. This in turn has involved him in the developing relationship of psychiatry to the field of social work: here he has personally made important contributions (not discussed in this volume) through his teaching and research in psychotherapy. During World War II as psychiatric consultant in the Office of Strategic Services he contributed to the task of personnel selection. Later activity with the screening center of the information control division in the United States zone in Germany brought experience in political psychiatry. Here ascertaining the reliability of Germans who would be in influential political or educational positions was a central consideration; the author also directed himself to the ascertainment of specific psychologically significant differences between Nazi and non-Nazi. This is an excellently written work that is intended to expose the broader aspects of the author's personal experience, with particular emphasis on the development of psychiatry in fields outside of but related to medicine. It should be read by every medical student and psychiatrist; a perspective about psychiatry otherwise quite difficult to achieve can be gained.

Family Skeletons. By David D. Whitney, Professor of Zoology, University of Nebraska, Lincoln. Cloth. Price, $4. Pp. 284, with 246 illustrations. University of Nebraska Press, Lincoln, 1946

This book is one of a series intended to popularize science, and the hope is expressed that this particular volume may "assuage fears and anguish over deformities." It consists largely of illustrations: the explanatory text is brief. An interesting series of pictures of twins, triplets, quadruplets and quintuplets is presented with explanation of the embryologic processes producing them. That is followed by illustrations of abnormalities, natural or artificial, which the author has found either in nature or in the literature. An estimate is given as to whether or not they are hereditary and, if they are, whether inheritance is dominant or recessive and whether of high or low "penetrance" (frequency). A general glossary of terms commonly used in the literature of human heredity is accompanied by a thirty page list (with definitions) of inherited abnormalities and diseases. Some of the illustrations may disturb rather than comfort the minds of the public, even though the conditions said to be inherited are not all dominant or of high frequency. A little more care by the author or publisher might have prevented some errors. Flexed fingers are said to be due to shortness of extensor tendons, page 106. Hallus (sic) valgus is said to be inherited and dominant, but the illustrations suggest bad shoes and bunions, page 113. Peroneal atrophy is illustrated with legs and hands affected (sic), page 179. "A few persons can move the skin on their forehead" (sic), page 223. "Vitamin C prevents pellagra," page 239.

Surgery: A Textbook for Students. By Charles Aubrey Pannett, B. Sc., M.D., F.R.C.S., Professor of Surgery, University of London, London, England. Second edition. Cloth. Price, 27s. 5d. Pp. 759 with illustrations. Hodder and Stoughton, Ltd. Warwick Square, London, E. C. 4, 1947.

In the author's preface, he cites the need for the student to "get his relative values right." This book includes the usual chapters on diseases of the abdominal organs, head injuries, diseases of the bone, etc. However, chapters on gynecology, ear, nose and throat, bacteriology and pathology have been purposely left out by the author, who feels that these subjects rightly belong to those who teach them.

The text is easy to read; the substance is factual, and presented in a manner devoid of verbiage. The illustrations are extremely diagrammatic, and are used throughout instead of photographs or roentgenograms. The author feels that the student may grasp the point of the illustration more readily if it is simply presented. He makes the interesting observation that these "mind pictures" are more effectively portrayed with an imperfect technic by a surgeon who understands the problem at hand than by an expert who does not.

The chapter on tissue repair and the healing of wounds is comprehensive and adequate in detail. The chapter on gangrene includes an exposition of the common vascular diseases of the extremities with their management. The book is an excellent source of medical information for the student.

Studies on the Formation of Cellular Substances During Blood Cell Production. By Bo Thorell. Paper. Price, 12s. Pp. 120, with 59 illustrations. Henry Kimpton, 25 Bloomsburg Way, London, W.C. 1; P.A. Norstedt & Soner, Tryckerigatan 2, Stockholm 2, 1947.

During the last two decades, remarkable progress in hematology has been achieved by means of sharper demarcation of the various clinical pictures and by application of dynamic physiologic mechanisms to the interpretation of the presenting symptoms and signs. However, in most of the disorders full comprehension is lacking because the underlying disturbances of cellular metabolism remain an enigma. In this important monograph, Thorell has applied the ingenious technics developed by Caspersson for the study of cellular protein formation to the problems of blood cell production. The complicated microspectrographic methods used in these investigations are described in detail. By comparison of the distribution and concentration of the ribose polynucleotides in the hemopoietic cells with the quantitative cytology of the bone marrow, it could be shown that the new formation of cellular proteins during hemopoiesis takes place at an early stage of development. During this stage, high concentrations of ribose polynucleotides exist in the cytoplasm and nucleolar apparatus. During the maturation phase of the blood cells, the concentrations of the ribose polynucleotides decrease continuously, parallel with a declining growth activity of the cells. This latter activity seems to be regulated by a definite part of the chromatin. Endocellular synthesis of hemoglobin does not start before the ribose polynucleotide metabolism is finished. When the maturation phase is ended, the main synthesis of hemoglobin begins. These metabolic processes also operate in the production of the granulocytes. In leukemia, there exists a measurable hypertrophy of the metabolism of the ribose polynucleotides associated with the new formation of new cellular proteins. In pernicious anemia, the polynucleotide and hemoglobin composition during cell genesis was also found to be definitely abnormal. This study is a stimulating contribution. It will be of particular interest to investigators who realize that the future of biologic research is closely connected with a better understanding of intracellular metabolism.

Letheon: The Cadenced Story of Anesthesia. By Chauncy D. Leake. Paper. Pp. 128. The University of Texas Press. Austin, 1947.

The author suggests that this experiment in cadenced narrative of the story of anesthesia should be read aloud or not at all. The author has read it aloud to several medical assemblages, and its reception caused him to make it generally available. The story is supplemented by a chronology of anesthesia and a fine bibliography and index, which make it the kind of book one expects from Chauncey D. Leake. Except for a slight unevenness the work holds the attention, but the story is so condensed that rereading is frequently required for comprehension. Here is a sample in which the author relates a well known anecdote:

> Obstetrics grew with Simpson's chloroform.
> Amusing to us now, he drew upon himself
> the wrath of clergymen, who thundered that
> he dared attempt relief of pain
> in child birth as decreed by God.
> But he prevailed by silly argument
> that God Himself approved of anesthesia,
> since He had set the precedent by giving
> sleep to Adam at the birth of Eve.
> When later he was knighted, friends proposed
> a coat of arms, a naked babe, with motto,
> "Does your mother know you're out?"

The Doctor in Oregon: A Medical History. By O. Larsell, Professor of Anatomy, University of Oregon Medical School, Portland. Cloth. Price, $10. Pp. 671, with illustrations. Published for the Oregon Historical Society by Binfords & Mort, 108 N. W. Ninth Ave., Portland 9, 1947.

The earliest doctors came to the Pacific Northwest with the explorers and fur traders. They were truly pioneers. In 1923 Dr. Olaf Larsell, professor of anatomy at the University of Oregon Medical School, initiated a medical history club of the Medical School of the University of Oregon. From this nucleus came a survey of the growth of medicine in Oregon and in the Northwest which makes this history one of the most adequate and competent in the field of the history of medicine as it covers various portions of the United States. Here is the detailed story of the medical missionaries, including the fascinating account of the Whitman Mission, already available in other published works. The biographies of individual physicians who participated in the care of the sick in the Northwest, the developments in public health and in medical science, the regulation of medical practice and the epidemiology are all fully covered in this amazing compilation of material. If there is any single criticism it is the lack of typographic variety and the somewhat congested manner of presentation.

Atlas of Bacteriology. By R. Cranston Low, M.D., F.R.C.P.E., F.R.S.E., Bacteriology Department, University of Edinburgh; Edinburgh, Scotland, and T. C. Dodds, F.I.M.L.T., F.I.B.P., F.R.P.S., Laboratory Supervisor to the Department of Pathology, University of Edinburgh. Cloth. Price, $8.50. 168 plates. Williams & Wilkins Co., Mount Royal and Guilford Aves., Baltimore 2. 1947.

This atlas is for the medical undergraduate who can compare its color photographs with what he sees under the microscope. The plates show clinical material such as pus, urine, blood and sputum with the organisms, the culture films stained, the tissues with the organism in situ and, finally, cultures on various mediums.

Medicine for Moderns: The New Science of Psychosomatic Medicine. By Frank G. Slaughter, M.D. Cloth. Price, $3.50. Pp. 246. Julian Messner, Inc., 8 W. 40th St., New York 18, 1947.

Psychosomatic medicine is the catchword of the hour, and Dr. Frank Slaughter has written about it for persons generally. While not himself especially trained in the field, he has read the best available literature, and his book is essentially a translation of the available writings into everyday English. Yet comprehension may still be difficult for those without some college background in modern psychology and even psychiatry. Dr. Slaughter has been unable to avoid the diction of this new field, and such expressions as "genitalization of the libido" and "id" and "superego" complicate the text. For the unenlightened the explanations do not quite explain. About the best of the chapters is that called "The Discontented Colon." In view of the various organic changes that have been proclaimed in fibrositis, the author seems to overemphasize its psychosomatic origin. Thus far the available evidence does not explain many of the clinical manifestations of fibrositis. Perhaps psychosomatic medicine is not yet ready for dispensing to an unaware public. The conclusion that psychosomatic medicine is the "penicillin" for emotional discord is somewhat too broad a claim.

American Medical Research Past and Present. By Richard H. Shryock, Ph.D., Professor of History and Lecturer in Medical History, University of Pennsylvania, Philadelphia. Studies of the New York Academy of Medicine, Committee on Medicine and the Changing Order. Cloth. Price, $2.50. Pp. 350. The Commonwealth Fund, 41 E. 57th St., New York 22; Oxford University Press, Amen House, Warwick Sq., London, E. C. 4, England, 1947.

Dr. Shryock traces the historical development of medical research in the United States from European sources to the cultural independence that developed after 1895. The outstanding leadership of William Welch is recognized, and the appreciation and growth of private support are adequately recorded. After a chapter on public relations the growth of public support is described, including the work of the National Research Council and the great voluntary agencies. Dr. Shryock concludes that far more support of basic research is needed than has thus far been available, particularly because medical research makes progress chiefly on basic research. He supports the view that there should be governmental support of the social sciences, yet apparently fails to realize the possible menace in political application of social science research.

Brain and Intelligence: A Quantitative Study of the Frontal Lobes. By Ward C. Halstead. Cloth. Price, $6. Pp. 206, with 27 illustrations. University of Chicago Press, 5750 Ellis Ave., Chicago 37, 1947.

Within the narrow limits of two hundred and six pages, Dr. Halstead has compressed a report of twelve years of investigation of the relation between lesions of the brain and "biological" intelligence, which he feels is superior to psychometric, clinical and neurologic concepts of intelligence. Through intensive testing of 237 patients, and through factorial analysis of his results with twenty-seven tests (many of them devised by him for this purpose), he finds "biological" intelligence to consist of four factors: the central integrative field factor, *C*; the abstraction factor, *A*; the power factor, *P*, and the directional factor, *D*. These are measurably reduced through extirpation of cerebral tissue, and this reduction is expressed in quantitative terms as an impairment index. Part II discusses localization of function in the cerebrum through an analysis of the degree of impairment found after lobectomies in the several lobes, the greatest degree being found in the frontal lobes. The appendixes include abstracts of medical histories, diagrams of cerebral lesions, brief descriptions of tests, numerous tables and an extensive bibliography.

All readers must be impressed by the painstaking scholarship shown in the study, and by the ingenuity of the technics developed, but a few may be left with some disturbing questions: (1) Has more attention perhaps been paid to the tests than to the persons tested? (2) Can more be derived from a factorial analysis than is put into it in the first place? (3) Since the neuropsychiatric patients showed an impairment index as great before lobotomy as after it, wherein lies the unique character of "biological" intelligence?

Surgical Disorders of the Chest: Diagnosis and Treatment. By J. K. Donaldson, B.S., M.D., F.A.C.S., Professor of Surgery and in Charge of Thoracic Surgery, University of Arkansas School of Medicine, Little Rock, Ark. Second edition. Cloth. Price, $8.50. Pp. 485, with 148 illustrations. Lea & Febiger, 600 S. Washington Square, Philadelphia 6, 1947.

Dr. Donaldson has attempted to compress into four hundred and seventy pages an up-to-date presentation of the various aspects of surgical diseases of the chest. His principal objective is to supply a relatively brief and readable summary of the manifold developments in the fields of thoracic surgery so that the general practitioner and general surgeon reading the book can be kept abreast of the possibilities of thoracic surgery. The first part deals with inflammations and tumors and congenital anomalies of the thoracic wall and thoracic injuries; the second part with nontuberculous intrathoracic infection, pulmonary embolism and infarction as as well as intrathoracic tumors and congenital abnormalities; the third part deals with the surgical therapy of tuberculosis. The book is abundantly illustrated, and for those who wish to study further in any of the fields covered there is a good bibliography at the close of each chapter. In this edition the author has included a section on the advances which have come out of World War II in the treatment of traumatic lesions of the chest and their sequelae, notably, decortication of the lung. A new section has been added on antibiotic therapy, technics of anesthesia of thoracic surgery, artificial respiration, inhalation therapy and cardiac resuscitation. Advances in the field of esophageal and cardiac surgery have also been included. Clarity would have been better served at times if obsolete and unproved methods were not reported and emphasis applied to well proved methods. Insufficient space was given to the subject of pulmonary resection for tuberculosis and the indications for resorting to resection in abscess of the lung. The book is a useful adjunct to the library of the house officers, general practitioners and general surgeons for whom it was intended.

The World Within: Fiction Illuminating Neuroses of Our Time. Edited by Mary Louise Aswell. With an introduction and analyses by Frederic Wertham, M.D. Cloth. Price, $3.75. Pp. 376. Whittlesey House, McGraw-Hill Book Co., 330 W. 42d St., New York 18, 1947.

From the fiction of the world the author has chosen illuminating portions which describe neuroses as observed by competent writers of fiction. To each section there is an introduction by Frederic Wertham, representing essentially an analysis from the point of view of modern psychiatry. For both the amateur and the professional in the field of psychiatry this is a fascinating work.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST

RH SENSITIZATION

To the Editor:—A 26 year old woman, married for the second time, has a daughter 6 years old. Complications of a first pregnancy were absent. Four years ago last June she delivered a stillborn infant. At that time she found out that she was Rh negative and was told that was the reason that the baby died. Her first husband was not tested. Her second husband is Rh negative (tested at two laboratories), but last August she lost a baby after a six and one-half month pregnancy. It had been dead nine weeks before she delivered it. Could this be due to the Rh factor if both the patient and her second husband are Rh negative They are anxious to have children

Ethel M. Walker, M.D., Ardmore, Okla.

ANSWER.—The clinical story, namely, the birth of a normal child followed by two stillbirths, is compatible with the diagnosis of Rh sensitization as the cause of the stillbirths, and this is further supported by the statement that the patient is Rh negative. However, this interpretation is contradicted by the report that the second husband is Rh negative, considering that two Rh-negative parents can have only Rh-negative fetuses, and Rh antibodies cannot harm an Rh-negative fetus. Unfortunately, errors in Rh testing are notoriously frequent even in laboratories of reputable hospitals, due to the delicate nature of the tests. Unless the tests have been done by one of the central laboratories specializing in Rh testing, the report must therefore be taken with a grain of salt. It is significant that no mention is made whether the patient's serum contained Rh antibodies, and tests for Rh sensitization are essential before a reliable opinion can be offered. If the reports that the patient and her second husband are both Rh negative are comfirmed, and no Rh antibodies are demonstrable in the patient's serum, then one can safely assert that the stillbirths were not due to Rh sensitization. The prognosis for future pregnancies would then depend on the etiology of the stillbirths. For example, if the patient has latent diabetes, another stillbirth might possibly be avoided by suitable treatment of the patient during the next pregnancy, while if the stillbirth were due to accidental factors, such as knotting of the cord or abruptio placentae, repetition of such accidents would not be likely to recur in still a third pregnancy. On the other hand, if there has been a laboratory error, so that the second husband is really Rh positive and the stillbirths are due to Rh sensitization, then further studies are necessary to determine, if possible, whether the husband is homozygous or heterozygous and to determine the titer of the Rh antibodies in the patient's serum. With reliable information of this sort, a definite prediction may be possible regarding the probable outcome of subsequent pregnancies.

TRAUMA IN PREGNANCY

To the Editor:—A white woman aged 37 is 53 inches (134.6 cm.) tall and weighs 133 pounds (60.3 Kg.). She has hyperlordosis. She fell down a flight of stairs in March 1945, sustaining injury to her back. At that time history of pregnancy or bleeding was absent. On June 3, 1945, she had a complete abortion which she thought had started in February 1945. In February 1946 she had another spontaneous abortion. On Dec. 29, 1947, she had a hysterectomy because of bleeding, and a diagnosis of myoma of the uterus was made. At that time a left cystic ovary was removed. The microscopic report did not show myoma. Could these miscarriages and apparent functional bleeding be due to the injury she sustained in 1945?

M. D., Connecticut.

ANSWER—A possible connection, scientifically, with the patient's signs and symptoms and the fall and possible injury to the back is not apparent. The abortion occurred when the patient was approximately three to three and one-half months pregnant and at least two months following the injury. A second abortion is even stronger evidence against trauma's producing the abortion.

Traumatic abortions are usually produced by direct trauma against the abdomen and wall of the uterus and may lead to abruptio placentae and abortion.

Another conceivable method of production of traumatic abortion would be trauma severe enough to rupture the corpus luteum of early pregnancy. Trauma of such severity in such a well protected organ seems improbable.

A much more logical point of view would be to assume that this 37 year old woman probably had fibroid tumors for at least two years before operation and that they were more likely the cause of the abortions. Women with fibroids are less likely to get pregnant than others, are more likely to abort and if they carry a baby to visibility or term are more likely to have complications of labor.

From the wording one cannot determine whether the sections reviewed showed myomas or whether there were none present in the uterus as a whole.

With uterine fibroids, Dr. Arthur Curtis has called attention to so-called oyster ovaries, slightly enlarged and soft.

With cystic glandular hyperplasia of the endometrium or so-called swiss cheese endometrium, the ovaries may contain atretic follicle cysts. However, this type of endometrium usually shows no secretory or progestational phase and therefore the patient probably does not ovulate and therefore probably would not get pregnant In this case, the operation followed the last pregnancy by nearly two years, and therefore cause and effect relationships are only theoretical.

ELECTRICAL RESISTANCE OF BODY

To the Editor:--In volume I of "Legal Medicine and Toxicology" by Peterson, Haines and Webster, second edition, page 264, the following statement is made relative to electrical resistance between the two hands of a person. "Herold quotes Bullard's computations on 259 males, where the resistance from one hand to the other varied from 550 to 1,970 ohms, and in a series of measurements of 236 men, also quoted by Herold, the average resistance was 1,184 ohms, the extremes ranging from 610 to 1,870 ohms." These figures are so grossly at variance with a few tests which I have made on my own hands and which have been made for me by various radio men on the ohm meters which are now in common use in radio repair establishments that it is impossible for me to reconcile my figures with those stated in the book, my tests showing ohm values of ten or more times those mentioned. What is your opinion?

Robert B. Taft, M. D., Charleston, S. C.

ANSWER.—In the absence of details as to the tests conducted by the questioner, one can only answer by quoting more extensively from volume 1 of "Legal Medicine and Toxicology" by Peterson, Haines and Webster, second edition, pages 263 and 264.

Resistance of the Body.--One of the most important safeguards against the passage of electric currents through the human body is its high degree of resistance. This is largely proportionate to the fluid constituents. This is very frequently stated to be from 1,000 to

3,000 ohms, but there are so many circumstances which modify this that didactic statements should not be made without taking these into consideration. Thus, when the epidermis is perfectly dry, its resistance to the passage of electric currents has been shown by Jolly to be very high, measuring, in Siemen's units, from 8,000 to 40,000 ohms (Herold). Dry skins are more resistant, also hard and oily skins. Moist, soft and perspiring skins have much reduced resistance. If the skin is thoroughly moistened, the resistance of the body may register but 500 ohms, and skins treated with alkalis that remove the fat are less resistant. Herold quotes Bullard's computations on 259 males, where the resistance from one hand to the other varied from 550 to 1,970 ohms, and in a series of measurements of 236 men, also quoted by Herold, the average resistance was 1,184 ohms, the extremes ranging from 610 to 1,870 ohms. In addition to this external moisture there may be a number of important factors, pertaining to the internal composition of the tissues through which the currents may pass, which are but little understood.

"ERTRON"

To the Editor:—What is the consensus regarding use of "ertron" in certain or any type of rheumatism?

R. B. McBride, M.D., Dallas, Texas.

ANSWER.—Treatment of various types of arthritis by the use of concentrated vitamin D, of which "ertron" is an example, was proposed by Dreyer and Reed in 1935. Since then, certain commercial products of concentrated vitamin D have been highly, and sometimes objectionably, publicized, especially for the treatment of rheumatoid arthritis. But after their use in such cases, no significant number of sustained remissions and little or no objective improvement have been noted by the majority of critical investigators, although decrease in pain sometimes has been noted. The value of concentrated vitamin D in the treatment of other articular and rheumatic diseases is even more uncertain. Most experienced rheumatologists now regard these products as essentially useless for any type of arthritis.

The use of concentrated vitamin D is not without danger. Such therapy mobilizes calcium in the body and may lead to its ectopic localization in various parts of the body, notably in joints and in kidneys. Severe renal damage and even death may result. Although untoward reactions are said to result less often from electrically activated vaporized sterol (such as "ertron") than from ultraviolet irradiated ergosterol, severe and sometimes fatal reactions have accompanied the use of "ertron." "The drug [ertron] is far from being as innocuous as its manufacturers claim" (Kaufman, P.; Beck, R. D., and Wiseman, R. D.: THE JOURNAL, p. 688 [June] 1947).

MALE FERTILITY

To the Editor:—1. Is there a relationship between the sperm count and protein levels in the blood? 2. Is there a relationship between the sperm count and age of the subject? 3. Please list a few articles which deal with the sperm counts and male fertility.

M.D., Wisconsin.

ANSWER.—1. Fifteen years ago Meaker and his coworkers showed that protein starvation can be a factor in human male infertility. Their diagnosis of this dietary insufficiency was made, not by direct determination of protein levels in the blood, but indirectly by a quantitative comparison of intake and output of nitrogen. The resulting infertility in such cases is evidenced by a high incidence of abnormal morphology oftener than by a reduction in the sperm count.

Reynolds and Macomber had previously reported the effect of protein deficient diets on the fertility of white rats. Among their experimental animals only 14 per cent of matings were fertile, as compared with 65 per cent among control animals on a normal diet.

2. In general, male fertility tends to decline slowly after middle age. This change may be indicated by lower sperm counts, poorer morphology or a higher incidence of abortions and stillbirths when pregnancies occur. But there is great individual variation. Even in advanced old age many men continue to produce apparently good semen, and some prove to be clinically fertile.

3. The subject of sperm counts and male fertility is adequately covered in the texts of Hotchkiss and of Lane-Roberts and associates. Each of these books gives an extensive bibliography.

MENOPAUSE

To the Editor:—My patient complains solely of her knees—"warm on the outer side, cold on the inner side." This is true on physical examination. Patient is a woman at menopause. She has no other complaints. What is your opinion?

M.D., New York.

ANSWER.—A therapeutic test with estrogens, administered either orally or parenterally, should suffice to determine whether the symptoms are ascribable to the menopause. The dosage should be that commonly given for relief of menopausal symptoms.

HEMOLYZED BLOOD

To the Editor:—Can hemolyzed blood be transfused without regard to its original type? Is it a safe procedure—safety referring to the freed hemoglobin suddenly introduced into the recipient's system? Will hemolysis of the blood destroy its respective agglutinogens, making it thus a solution of foreign protein apt to cause a foreign protein reaction in the recipient's body?

H. J. Kent, M.D., Savannah, N. Y.

ANSWER.—To the best of our knowledge transfusion of hemolyzed blood is practically and theoretically a dangerous procedure. Hemoglobin has been used experimentally as a blood substitute only after freeing the solution of cell stromas. The antigenicity of whole blood is well established, and there is no evidence that hemolysis of the red cell destroys its ability to act as an antigenic agent.

RABIES

To the Editor:—Two months previous to his death, a patient, 45 years of age, was bitten on a finger tip by his dog. The dog died a "few" days after the patient received the injury. The number of days is uncertain, but definitely less than ten. There is no record that the dog had been vaccinated against rabies. His head was examined by the state laboratory which reported that Negri bodies were not found. Intracerebral inoculation with emulsions of the dead dog's brain was not performed. A clinical record of a veterinarian to justify the assumption that the dog did not have rabies is lacking. For lack of certainty, this patient received fourteen injections of phenol-killed rabies virus vaccine. No reactions occurred and the patient was well until six days previous to his death. The onset of the final illness was sudden with severe persistent low retrosternal pain and moderate shock, but without evidence of hyperirritability, spasms or delirium. Serial electrocardiographic tracings showed a progressive, extensive, myocardial infraction involving the septum. There were moderate fever (up to 101F.) extensive myocardial infarction involving the septum. There were moderate fever (up to 101 F.) and leukocytosis. On the fourth day of the illness he became disoriented at times, unable to sleep and gradually so restless that at the end of the fifth day he had to be restrained. In spite of paraldehyd orally and hypodermically, barbiturates by mouth and intravenously, the restlessness did not abate, so that it was deemed advisable to give him "pentothal sodium" as a last resort. The patient died a few minutes after the instillation of tribromoethanol solution with sudden cyanosis and cessation of the heart action. No necropsy was permitted. The question of rabies came up for discussion before death, but in view of the history, the lack of dysphagia and respiratory disturbances, the prophylactic vaccination and the sudden onset with a classical picture of coronary infarction, it was felt that diagnosis of rabies could not be seriously entertained. The method of intracerebral inoculation of mice with penicillin-treated saliva was then not known to us. Unusual precautions to protect the physicians, nurses, or relatives were not taken. The only method of transmission to be considered in this case is the possibility of droplet

infection, as he did have a moderate cough. 1. Is it reasonable to rule out rabies altogether? 2. Can the coronary infarction, and especially the terminal irritability, be considered as part of a delayed reaction to vaccine?. 3. Under the circumstances presented, should the attending personnel be vaccinated in spite of the known danger of vaccination? 4. Which vaccine should be preferred, the simple phenol-killed or the ultraviolet-killed virus?.

M.D., Pennsylvania.

ANSWER.—1. No conclusive evidence of rabies is presented in either the dog or the patient.

2. Whether the vaccination played any part in the final illness cannot be determined, but the illness may have occurred independently of the vaccination.

3. There are no indications for antirabic vaccination of the attending personnel. There is no evidence of rabies in the patient, and then rabies is not spread by droplet infection in the usual sense.

DERMATITIS HERPETIFORMIS

To the Editor:—A patient who is known to have diabetes has been taking plain and protamine zinc insulin for seven years, and the disease is well controlled. Approximately three years ago a rash developed on the elbows, knuckles, knees and buttocks. A dermatologist at that time prescribed sulfapyridine. The rash completely disappeared for five months. When it recurred, he was given roentgen therapy and again put on sulfapyridine. Since that time, rash recurs immediately whenever sulfapyridine is withdrawn, and the patient is on a maintenance dose of 5½ tablets of sulfapyridine daily. The rash does not vary in severity with temperature or seasonal changes. At this time, there is seen only a few small dried crusts on the elbows, but when sulfapyridine was withdrawn several days ago, small vesicles appeared within twenty-four hours, with only a mild degree of itching. The patient has no other complaints, and history and physical examination are otherwise negative. Various other sulfonamide drugs and penicillin fail to control the rash.

J. H. Bohnfalk, M.D., San Antonio, Texas.

ANSWER.—The original use of sulfapyridine prescribed by a dermatologist, the disappearance of the eruption following its administration and the presence of vesicles when the eruption recurs suggests diagnosis of dermatitis herpetiformis—Duhring's disease.

For reasons that are not clear the sulfonamide compounds, notably sulfapyridine, may be effective in treatment of dermatitis herpetiformis; continued administration may prevent recurrence of the disease. For some patients the maintenance dose may be as little as 1 or 2 tablets daily or every other day. The drug should be administered with sodium bicarbonate.

Dermatitis herpetiformis frequently occurs in the highly strung overactive "can't relax" type of patient. This has caused speculations on the psychodynamics of the malady. There is no known relation of the disease to diabetes.

Other phases in treatment concern attention to the general state of health; with particular reference to rest, recreation, relaxation and conservation of nervous energy, a strict saltless diet and avoidance of ingestion of the other halogen compounds—iodides and bromides. Exposure to the ultraviolet light to the extent of tanning and injections of the patient's own blood into the buttock are at times helpful. The oral administration of solution of potassium arsenite—Fowler's solution—has long been used in treatment. Too continuous administration, of course, should be avoided. In some patients recurrence of the disease may be prevented by alternating maintenance doses of Fowler's solution and sulfapyridine. Local treatment of dermatitis herpetiformis is discussed in textbooks on diseases of the skin.

ALLERGY FROM SHOES

To the Editor:—I have under my care a patient who presents a chronic papulovesicular eczema of both feet of several years' duration. Secondary fungous involvement has definitely been cleared up. Results of potassium hydroxide tests and culture (Sabouraud's) have been negative for several months. Patch tests to shoe dye and shoe leather have been negative in result, but the eruption clears up on therapy with aluminum acetate solution N.F. and boric acid ointment as soon as he is kept off his feet and prevented from wearing shoes. He has had ample roentgen therapy from previous dermatologists. Can you recommend anything as a protective agent to prevent contact with shoe leather again, or what procedure could be used to protect or substitute for shoe leather? I know of no "synthetically" made shoes, and it will be a problem to put some walking apparel on this man after the eczema clears up.

M.D., Ohio.

ANSWER.—Dermatitis from shoes may occur from materials other than the leather or dye. Shaw (Arch. Dermat. & Syph 49:191 [March] 1943) reported 22 cases of dermatitis due to shoes in which the offending substances were found to be glue, felt, canvas, polish, trimmings, dye, top leather and the lining leather of the shoes.

An effort should be made in this case to determine the offending agent by means of patch tests. In unusual cases such as this, manufacturers are usually willing to cooperate by furnishing the materials for testing. Also, it may be possible for the patient to avoid trouble simply by changing to another brand of shoes. The chemical processes used in the manufacture of shoe materials are numerous and varied, not all shoes being chemically alike. If the patient is bothered by all brands of leather, he could wear shoes made of canvas, and the skin could be protected by the application of a paste such as paste of zinc oxide thinned with a little petrolatum if necessary.

MONGOLIAN IDIOCY

To the Editor:—The wife of a major of this Command gave birth to fraternal male twins in Japan four months and three weeks ago. One weighed 5 pounds 10 ounces (2,552 Gm.) and the other 5 pounds 2 ounces (2,325 Gm.) Up to the time that I first saw them three weeks ago the parents had been told that the children were perfectly normal. Both parents are intelligent. The father is 30 and the mother 28 years of age. Family backgrounds are not unusual. The mother was the seventh child in her family, born when her own mother was 42 years of age. During the year before the last pregnancy with the twins the major's wife had irregular and briefer menstrual periods than at any other time.

Examination of the twins revealed that one weighed almost 18 pounds (8,165 Gm.); he was lethargic and pale; the anterior fontanelle admitted one finger; he had "mongoloid facies"; when he cried after I squeezed his toe hard his face flattened out. The second twin weighed almost 15 pounds (6,804 Gm.), and all other observations were the same as that for the first boy, with the addition of a flat occipital area and a right testicular enlargement, which the parents state is getting smaller. Both boys eat well and do not cry much. Movements of the first child are slower and more "massed" than those of the second; both follow light with their eyes but tire easily; if I clap my hands they blink. Although the parents insist that the infants did not seem alike at birth they appear to be perfect identical twins at present.

I thought that they might be mongolian idiots and sent them to the pediatrician at the nearest Station hospital. He told the parents that they were idiots, without a possibility of a doubt, and painted the worst possible picture for the future. A blood cholesterol determination on one of the boys gave normal results.

Being without the advantage of a skilled consultant over here, these are my questions: 1. What things can be done when the twins are six to seven months of age to prove definitely whether they are mongolian idiots? If this age is too early, please describe in detail the tests that can be performed and the earliest possible age?

2. If they are mongolian idiots: (a) can I reassure the parents that this is something for which neither of them is responsible? (b) The parents are anxious to have a normal family but are now extremely fearful lest this might repeat itself. Should they be advised to try again? (c) What is the procedure usually advised with regard to placement in an institution? What are the average costs in a state or private

institution and at what age can the children be admitted? The parents are Texans, but, being in the Army, are in travel status. (*d*) If the diagnosis is correct, the parents are willing that medical science observe the boys for research, experimental medicine. The father will even take movies of them at various ages if this would contribute anything. Is there any group who might want to work with them? (*e*) (1) Is there possible benefit from surgical intervention? (2) Can mongolian idiocy be determined before birth?

Captain, M.C., U. S. Army.

ANSWER.—1. Check the physical findings elicited in a more thorough examination against those listed in any standard textbook of pediatrics—even one in Japanese, with the aid of a translator. The physiognomy is so characteristic that "the mongoloid facies" observed by the correspondent could be confirmed by photographs mailed to this country. At any Army Command it would also be a simple process to take handprints and footprints, which would be informative.

The distance between the bregma and occiput and the circumference of the skull should be measured for comparison with norms for the age, as brachycephaly is characteristic of mongolism. Abnormal formation of the ear lobes and the presence of congenital heart disease are in favor of the diagnosis. Other stigmas at 6 months of age due to generalized neuromuscular hypotonia would be inability to hold the head up, alternating or persistent strabismus and hyperflexibility of joints. No single finding is pathognomonic, but the aggregate syndrome is usually unmistakable. The testicular tumor might be an associated defect such as a hernia or hydrocele.

Roentgen examination of hands may reveal the defective formation of the middle phalanx of the fifth finger—found in about two thirds of mongoloid persons—and anteroposterior views of the skull may reveal the characteristic acromicria. Prints of these plates could easily be made for dispatch to the United States with the photographs and handprints.

2. (*a*) Epidemiologic evidence points toward maternal factors as the cause of mongolism.

(*b*) Multiple instances of mongolism in the same family are so rare as to warrant a "lightning does not strike twice in the same place" attitude toward future progeny. This advice, however, is predicated on a complete check-up of the mother's health with positive measures taken to remedy any chronic, systemic, endocrine or gynecologic disorders found (especially in view of the mother's menstrual history). It is also predicated on the placement of the mentally retarded twins in an institution in order to allow future children normal care in a normal home.

(*c*) The query should be made to the director of a state-maintained institution of Texas.

(*d*) Many large clinics would "want to work with them." However, a vast amount of research has been done on treatment of mongoloid persons without revealing substantial hope for cure. Of more promise is evidence that the condition may be prevented, at least in part, by an increased understanding and control of the causative factors and mechanisms operating in early pregnancy.

(*e*) (1) No. (2) Not clinically, occasionally at autopsy.

MEASLES IMMUNE GLOBULIN

To the Editor:—Are there any clinical data on the effect of measles immune globulin given prior to exposure, as might be done in the midst of an epidemic? I am particularly interested in knowing whether a complete prevention, rather than the desired modification, would result therefrom.

Manasseh Kamen, M.D., Brooklyn.

ANSWER—The immunity against measles produced by immune globulin is a passive immunity similar to that produced by convalescent serum and cannot be counted on to endure longer than two to four weeks. If given prior to exposure, but within the period for which it is effective, it should produce complete protection for that particular exposure. If given more than four days after exposure, but within eight or nine days of exposure, it should result in a modified attack which usually will produce permanent immunity. If one is uncertain as to the exact time of exposure the degree of protection cannot be accurately predicted.

TETANUS AND DIPHTHERIA TOXOIDS

To the Editor:—The following problems have come up at our institution: 1. How long do antitoxin titers against diphtheria and tetanus toxins remain at therapeutic level in the blood following immunization? 2. If an individual receives a dirty wound several years following immunization against tetanus, how soon after a booster shot will the titer be high enough to protect him? The question also applies to diphtheria. 3. Two persons have been immunized against diphtheria and tetanus, and years later one receives a dirty wound and the other is exposed to an active diphtheria case. How should each person be treated?

Harry W. Orris, M.D., New York.

ANSWER.—1. For a minimum period of two years. Actually, many persons will retain an established active immunity for a much longer time.

2. In the circumstances cited, the titer should rise to a high level within seven days and should protect against the disease named.

3. The action indicated in regard to the two diseases, diphtheria and tetanus, would not be the same. If a number of years had elapsed since the person with the dirty wound had been immunized against tetanus it would probably be safer to resort to passive immunization rather than rely on a booster dose of tetanus toxoid for protection. In respect to the patient who was exposed to diphtheria, one might wish to know whether infection took place at the time exposure occurred. Consequently, before adopting any prophylactic measures a culture should be taken from the nose and throat to determine whether diphtheria organisms are present, and at the same time a Schick test should be performed for susceptibility. If the patient is not susceptible, injections of diphtheria toxoid or diphtheria antitoxin would not be required. If the patient is susceptible but the nose and throat cultures are negative, then a booster dose of diphtheria toxoid would be proper. If the nose and throat culture is positive and the Schick test is also positive, administration of diphtheria antitoxin would be the approved procedure.

AIR IN PERITONEAL CAVITY

To the Editor:—As a general rule, how long after abdominal operation can gas or air be demonstrated by roentgen ray in the peritoneal cavity?

F. K. Hurt, M.D., Jacksonville, Fla.

ANSWER.—The presence of air in the peritoneal cavity is not uncommon following abdominal surgery, particularly when large masses of tissue, such as ovarian cysts or a large fibroid uterus, are removed. The duration of pneumoperitoneum is influenced by several factors, such as the amount of air, the position of the patient in bed and the normalcy of the peritoneum. Factors which influence the amount of air remaining in the peritoneal cavity after abdominal surgery are the length and location of the incision, the position of the patient on the operating table, particularly when the patient is shifted from the Trendelenburg to Fowler's position, the type of anesthesia, straining during the operation and drainage of the peritoneal cavity with tubes. Lewis (*Canad. M.A.J.* 28:18, 1933) reports that pneumoperitoneum is much more common when spinal anesthesia is used, due to the relaxation of the abdominal wall and the tendency to pull up the abdominal wall to the last stitch. He demonstrated air in the peritoneal cavity of 40 per cent of 25 patients when spinal anesthesia was used as compared to 13 per cent of 15 patients when gas, oxygen and ether were employed. He stated further that the major part of the air will disappear in ten days to two weeks, but in a few patients it may persist from four to six weeks. Pain and Rigler (*Surgery* 3:351, 1938) report that if 1,200 to 1,600 cc. of air is injected, pneumoperitoneum may be demonstrated roentgenologically for as long as two weeks. Bannen (*British J. Radiol.* 18:390, 1945) indicates that a small amount of air may be absorbed within twenty-four hours, but larger amounts may persist for fourteen days.

A survey of available literature indicates that ordinarily as little as 20 to 30 cc. of air can be demonstrated roentgenologically by proper positioning of the patient, that small amounts of air are absorbed within twenty-four to forty-eight hours, but that larger amounts may be observed for four-

teen or more days subsequent to abdominal surgery, particularly if the patient is placed in Fowler's position; then the air remains under the diaphragm, which is a relatively poor surface for absorption.

UNDULANT FEVER

To the Editor:—Please send me information concerning treatment and diagnosis of undulant fever including use of para-aminobenzoic acid in treatment.

William A. Guenon, M.D., Greencastle, Pa.

ANSWER.—The most reliable criteria for the diagnosis of undulant fever are history of patient, clinical symptoms and signs, a positive agglutination test and a positive blood culture. If the clinical symptoms and signs are suggestive of undulant fever but the agglutination test and blood culture are negative, one may make a skin test with "brucellergen" (a suspension of nucleoprotein from Brucella cells). Caution should be used in interpreting a positive skin test as certain evidence of infection. Those who have had the disease in the past also show a positive cutaneous reaction. Recently two methods of treatment have been developed. One involves the use of sulfadiazine and streptomycin (C. W. Eisele and N. B. McCullough, THE JOURNAL, Dec. 20, 1947, p. 1053) and the other, the administration of sulfadiazine orally and an intravenous transfusion of human blood plasma or whole blood. Instructions for use of the latter method may be obtained by writing to the Brucella Laboratory, Michigan State College, East Lansing.

"ATHLETE'S FOOT"

To the Editor:—The football coach of a Baltimore school has asked me about methods of controlling "athlete's foot." He has some literature on a machine by Peda Spray, Inc., located at 55 West Forty-second Street, New York. This is a clever apparatus but expensive unless effective. Is it worth while installing? I believe there is some evidence that the Navy used it.

Karl W. Ebeling, M.D., Baltimore.

ANSWER.—The Peda Spray machine is attractive and adaptable to any shower room. Mechanically it is simple and effective, in that the solution used reaches the parts of the feet desired. It is stated that one filling of the machine supplies treatment for 11,500 persons. The composition of the solution originally used by the Peda Spray Company was said to be 1.33 per cent salicylic acid, 7.6 per cent camphorated oil, along with a small quantity of eucalyptus oil and menthol, in a base of purified naphthol. According to data supplied by the Peda Spray Company, this formula is capable of destroying in five minutes the parasitic organisms that cause ringworm of the feet. In a report by Capt. H. S. Harding, (MC), U.S.N., to the Bureau of Medicine and Surgery, United States Navy, he was enthusiastic about this solution and this method of prophylaxis. In a recent communication from the president of the Peda Spray Company, it was stated that undecylenic acid is now being added to the Peda Spray solution in the "recommended percentages." Just how effective the present solution is against fungi in aqueous suspension is not stated. Observations by competent dermatologists and mycologists suggest that the greatest value of any method of prophylaxis is the stimulation to the individual to keep his feet clean and dry.

CLAUSTROPHOBIA

To the Editor:—A girl aged 18 has menopausal symptoms—hot flushes, irregular menstruation and also claustrophobia. The history is otherwise noncontributory. The basal metabolic rate is normal. Is estrogenic therapy indicated? Is there indication for some other kind of treatment?

M.D., Massachusetts.

ANSWER.—In spite of the hot flushes, this is not a case of premature menopause. The exact type of menstrual disturbance is not mentioned; hence, advice on therapy cannot be given. If the menses are simply far apart or scanty treatment is not necessary at the present time. Estrogenic therapy is not indicated for the hot flushes and irregular menstruation. The claustrophobia is an indication that there is some psychic disturbance, and this may also be responsible for the flushes and menstrual irregularity. For the psychic disturbance some form of psychotherapy is necessary. In addition, a thorough physical examination must be made, including, of course, a bimanual rectoabdominal examination if the girl is a virgin or a vaginal examination if she is not. If any abnormality is found it must be corrected, but almost certainly none will be present. After psychotherapy the flushes will probably disappear.

CHEILITIS

To the Editor:—A man aged 66 has been suffering from glossitis and cheilitis for six months. Nearly all the vitamins, riboflavin 20 to 30 mg. a day, nicotinic acid 200 to 300 mg. a day, vitamin B 20 mg. and vitamins A and C in the same proportion, have been prescribed. He gets good results, but as soon as I cut the dosage to half or to one third, relapse occurs within a week. Examination of blood and urine reveals normal conditions. Reaction to the Wassermann test is negative. He has had false teeth for fifteen years. Does this man need such a large daily dosage of vitamins as long as he lives? Which of the vitamins are indicated for glossitis and which for cheilitis?

H. K. Beshlian, M.D., Paterson, N. J.

ANSWER.—The recitation of treatment the patient received is somewhat obscure, because it is not clear what 20 mg. of vitamin B is. The individual components and their quantities should be stated. The indiscriminate combination of vitamins given is reminiscent of shotgun therapy of former years with other agents. Glossitis and cheilitis that are due to dietary deficiency factors are most apt to respond to administration of members of the vitamin B complex. Of these, nicotinic acid and riboflavin are most frequently effective, the former for the glossitis and the latter for the perlèche. Where individual components are lacking and their supply is effective, it is advantageous to add other members, too. Single factor deficiencies are unlikely to occur. The entire diet of the patient should be reviewed, its adequacy assessed and corrections or modifications made if indicated. Iron therapy and hydrochloric acid are sometimes helpful.

It should be ascertained whether there are other reasons for the glossitis and cheilitis. Is the patient sensitive to something in the composition of the dentures? Do they fit properly? Are they high enough to keep redundant folds from forming at the corners of the mouth with leakage of saliva? If adequate diet alone is insufficient to control this patient's oral changes, then 10 to 20 mg. of riboflavin should be tried for its effects and followed by a trial of 100 to 200 mg. of nicotinic acid alone. On the basis of the results obtained it can be ascertained which alone or in combination would be most useful.

DIARRHEAS OF INFANCY

To the Editor:—The reply in The Journal, page 1186, Dec. 27, 1947, to the question on diarrheas of infancy asked by a physician of Brooklyn stated that fluids should be given parenterally by vein or subcutaneously. There are many conditions in which fluids should be given directly into the blood stream and in which this mode of administration is preferred to the subcutaneous route, as it is more rapid with fewer complications. If use of the intravenous route is impossible, in many cases my associate and I have used the bone marrow route (Turkel, H., and Bethell, F. H.: A New and Simple Instrument for Administration of Fluids Through Bone Marrow, *War Med.* 5:222-225 [April] 1944). Several hundred papers have been published on the use of the bone marrow route.

Henry Turkel, M.D., Detroit

SENSITIVITY TO ANESTHETICS

To the Editor:-Is there any method of determining the sensitivity of a patient to local anesthetics such as "pontocaine" and cocaine? Has it been determined whether toxic reactions are more common with one or the other of these drugs?

M.D., Maryland.

ANSWER.—Methods to determine the sensitivity of patients to local anesthetics are not always reliable. By applying a patch test or by using a drop of fairly dilute solution (1 per cent) of the agent in the eye, it is possible to get an idea of the way the patient will react, especially to "pontocaine" and cocaine. Inflammatory reaction indicates probable sensitivity. Not infrequently the patient who gives a history of sensitivity to a local anesthetic is more sensitive to the epinephrine used with the local anesthetic than to the anesthetic itself.

Sensitivity of a patient to an anesthetic varies considerably. If sensitivity is only slight the agent is not dangerous for him. If sensitivity exists there is a method which usually reveals this important fact. The patient is seated with his back toward the anesthetist, and the skin of his chest is prepared by painting it with a 70 per cent alcohol solution. A separate syringe and needle are used for each solution. One of the solutions is isotonic solution of sodium chloride; the others are mild solutions (1 per cent or less) of each of the drugs to be tested • in this case "pontocaine" and cocaine.

A control wheal is raised by intracutaneous injection of 1 cc. of isotonic sodium chloride solution. Then at a distance of at least 2 finger-breadths on one side of this wheal 1 cc. of 0.1 per cent cocaine is injected and on the other side at the same distance from the wheal, 1 cc. of 0.1 per cent "pontocaine" is injected. The wheals which appear are observed for ten minutes. If enlargement and redness occur, the patient is considered sensitive to that drug injected. If the sensitivity is well defined generalized symptoms develop, such as apprehension, shortness of breath, pronounced nervousness, sometimes tremor and pallor, an increase in pulse rate or lowering of blood pressure. In extreme cases the patient will faint. The degree of reaction to the drug determines the degree of sensitivity and also the danger involved in the use of the drug in the person being tested. Various studies concerning poisoning from local anesthetics and treatment used have been reported by D. C. Bull and C. B. Esselstyn (Pantocaine in Spinal Anesthesia, *Ann. Surg.* 103:29-37 [Jan.] 1936); A. L. Tatum, A. J. Atkinson and K. H. Collins (Acute Cocaine Poisoning, Its Prophylaxis and Treatment in Laboratory Animals, *J. Pharmacol. & Exper. Therap.* 26:325-335 [Dec.] 1925); V. E. Henderson (Toxicity of Anaesthetics, *Bull. Acad. Med., Toronto* 17:113-115 [April] 1944); J. S. Lundy (Clinical Anesthesia, Philadelphia, W. B. Saunders Company, 1942, p. 28), and in Queries and Minor Notes (Sensitivity to Anesthetics, *J.A.M.A.* 126:402 [Oct. 2] 1944).

STREPTOMYCIN

To the Editor:—Has streptomycin by inhalation been tried for pulmonary tuberculosis? If so, has it been beneficial? Is there available a preparation of streptomycin in oil similar to the standard preparation of penicillin in oil and wax?

Robert S. Srigley, M.D., Hollis, Okla.

ANSWER.—Streptomycin in aerosol sprays has been used in the treatment of laryngeal and bronchial tuberculosis but it has not been used alone in pulmonary tuberculosis unassociated with laryngeal tuberculosis. Parenteral treatment associated with aerosol treatment is more effective in the treatment of laryngeal and pulmonary tuberculosis than aerosol treatment alone.

At present, there are no approved preparations of streptomycin in oil available for parenteral use that are similar to the standard preparation of penicillin in oil and wax.

BARBITURATES

To the Editor:—Does "seconal" 1½ grains (0.1 Gm.) taken every twenty-four hours for a long period of time have an effect on health? Will it shorten life? My patient is nervous and he states that "seconal" calms him. He now has taken it for three years and feels fine.

J. L. Waldner, M.D., Loveland, Colo.

ANSWER.—There is much to be learned regarding the effect on bodily function and life expectancy of the chronic use of the barbiturates. It appears well established that prolonged use of any of the barbituric acid derivatives will lead to tolerance and habituation. Hambourger has stated that one tenth of all drug habituation is due to barbiturates and that in one third of those so habituated a definite craving for the drug is experienced when it is withheld. The chronic use of the barbituates may lead to objective damage of the central nervous system as shown by nystagmus, positive Romberg sign and motility disturbances of a cerebellar nature. Euphoria is common, and in some instances mania may be the end result. In some cases of chronic barbiturate intoxication, convulsions may occur and urticarial rashes are not uncommon. As important as the physical changes which may be produced by the prolonged use of the barbiturates is the postponement of adequate treatment of the causes underlying the use of these drugs. Often they are used to combat unrecognized anxiety states and other neuroses. The proper treatment of such patients lies in adequate exploration of the underlying psychosomatic disease and the institution of appropriate remedial measures rather than the masking of such symptoms by the administration of sedatives.

DIABETIC ACIDOSIS

To the Editor:--Assume that one has a young patient with an intact cardiovascular renal system, who is diabetic and who goes into acidosis because of failure to take the required insulin. He receives insulin and fluids in amounts necessary to restore free urinary output. The aim of treatment is to stop the excessive production of ketone bodies. Therefore, urinary acetone and diacetic acid are checked hourly. Determinations of carbon dioxide combining power are also done hourly. (1) At what carbon dioxide combining power level do the acetone bodies in the urine usually disappear? I have noticed that they disappear while carbon dioxide combining power is still in the low 30's (volumes per cent). If an alkali (sixth-molar sodium lactate or 5 per cent sodium bicarbonate solution) is used, one can raise the carbon dioxide combining power more quickly and abolish the clinical hyperpnea. However, without adequate insulin and carbohydrate, the liver goes on producing acetone bodies in excess, even though the carbon dioxide combining power approaches normal. (2) How does this alkali solution affect the urinary acetone and diacetic acid tests? If the latter tests are made negative, then isn't the use of alkali solution dangerous because it masks the two tests (carbon dioxide combining power and urinary acetone bodies) that reflect the underlying pathologic physiology?

S. Richard Horio, M.D., Honolulu, Hawaii.

ANSWER.—(1) In the type of patient and situation described, it is common clinical experience that tests for acetone bodies in the urine usually become negative when the carbon dioxide combining power of the blood plasma rises to the general level of 25 to 34 volumes per cent. However, there is considerable individual variation due to a number of modifying factors, including the state of renal function and of urinary output, whether or not alkalis have been used in treatment and whether or not sufficient insulin has been given to permit resumption of utilization of carbohydrate. (2) Although the giving of sodium lactate or sodium bicarbonate furnishes base with which excess ketone acids may in part be neutralized, this is not of real value unless insulin is administered early in amounts adequate to allow utilization of carbohydrate, thereby stopping at the source the formation of ketone acids in excess. Unless enough insulin is given, the administration of alkali will not result in negative tests for acetone and diacetic acid in urine (and, in fact, ketosis may occur in alkalosis due to excessive administration of alkalis). Many clinicians successful in the treatment of diabetic coma do not use alkalis at all, and certainly serious errors in the evaluation of a patient's condition are possible when a plasma carbon dioxide value has been made artificially high by the giving of alkali.